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THE

JOURNAL

OF

GAS LIGHTING,

103909

WATER SUPPLY,

AND

SANITARY IMPROVEMENT.

VOL. LXXVI.

July to December, 1900.

LONDON:

WALTER KING,

11, BOLT COURT, FLEET STREET, E.C.

THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXXVI. No. 1938.] LONDON, JULY 3, 1900. 52ND YEAR. PRICE 6d.

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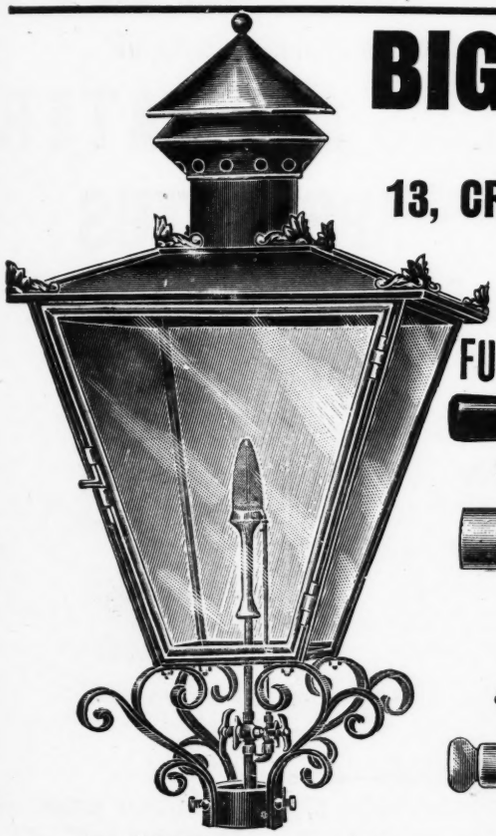
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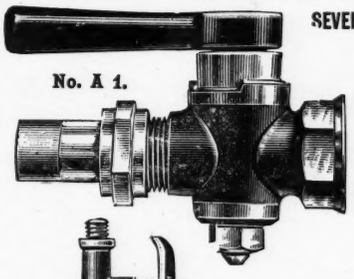
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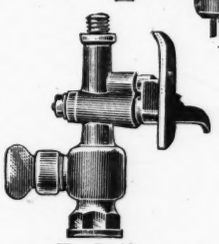
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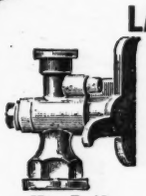
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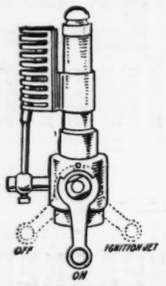

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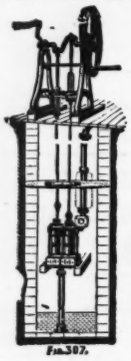

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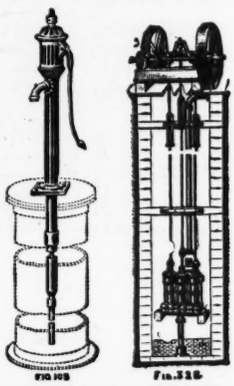

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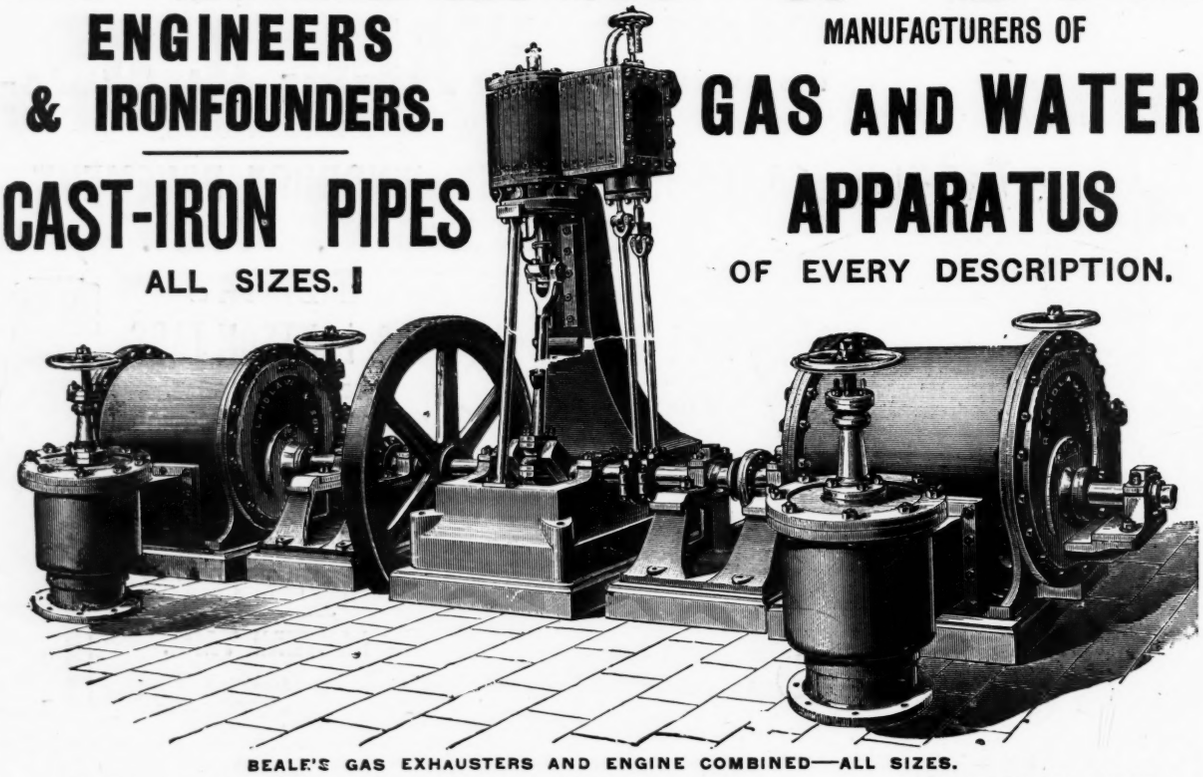

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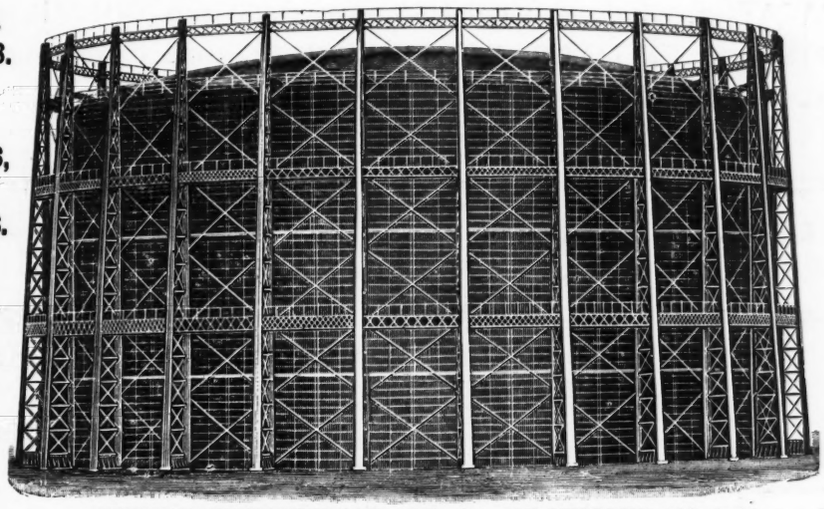

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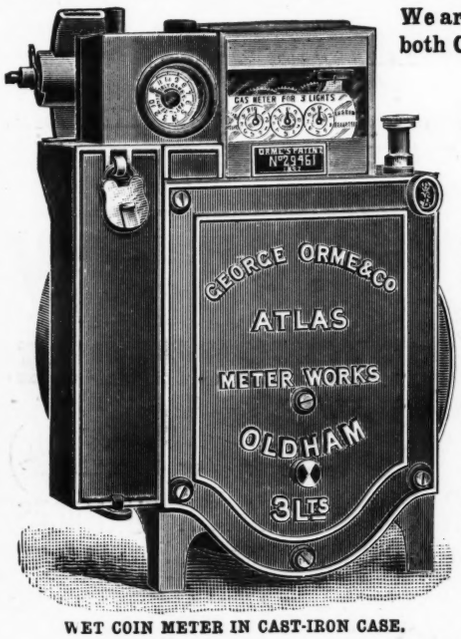

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A large number of these Meters are in use, and giving satisfaction.

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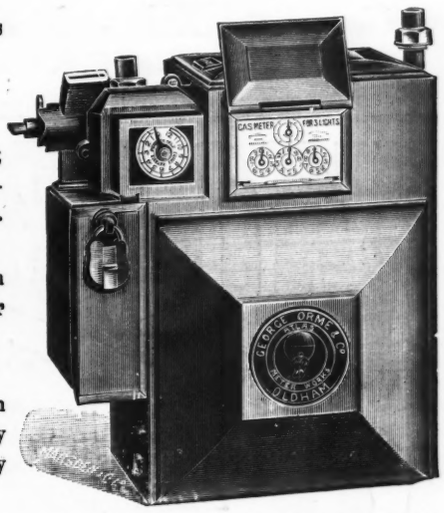

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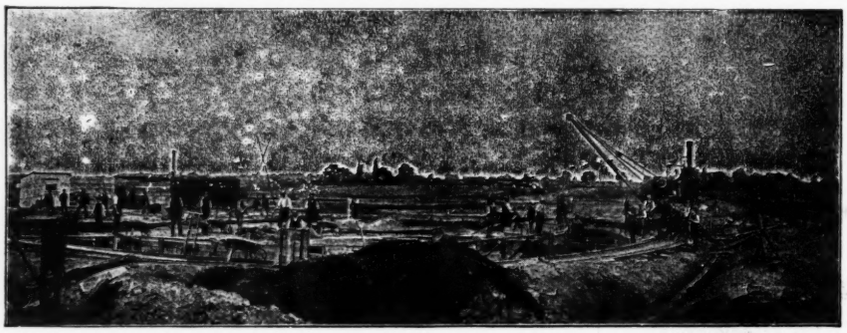

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Special Bricks & Blocks for GENERATOR & REGENERATOR FURNACES.

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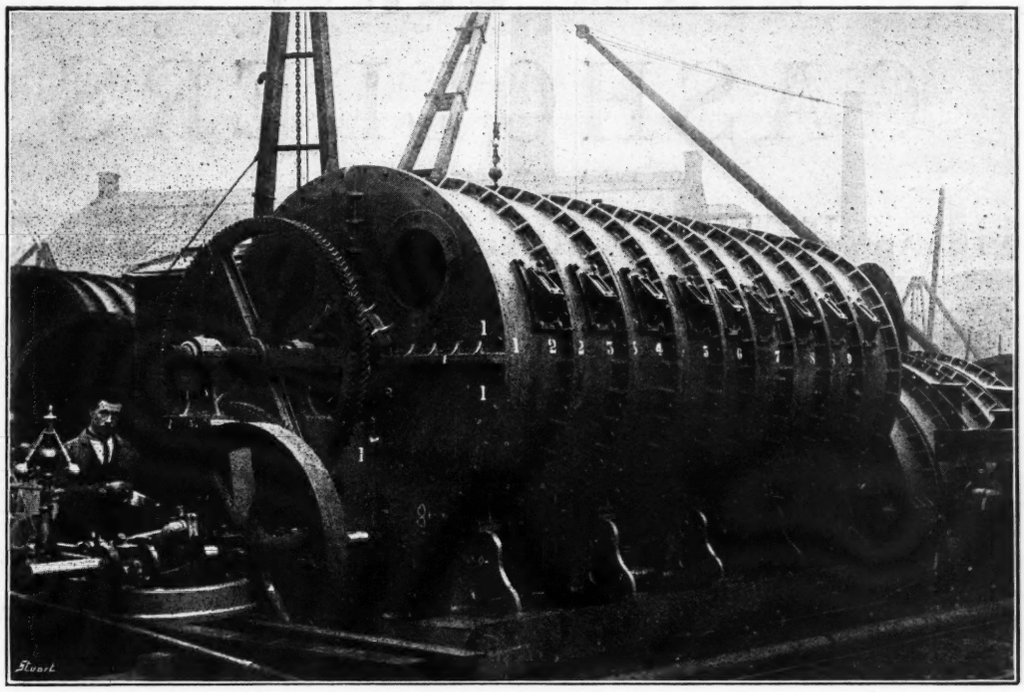
PATENT "NEW" SCRUBBER-WASHER

All Sizes from 50,000 to 5,000,000 Cubic Feet of Gas per Day.



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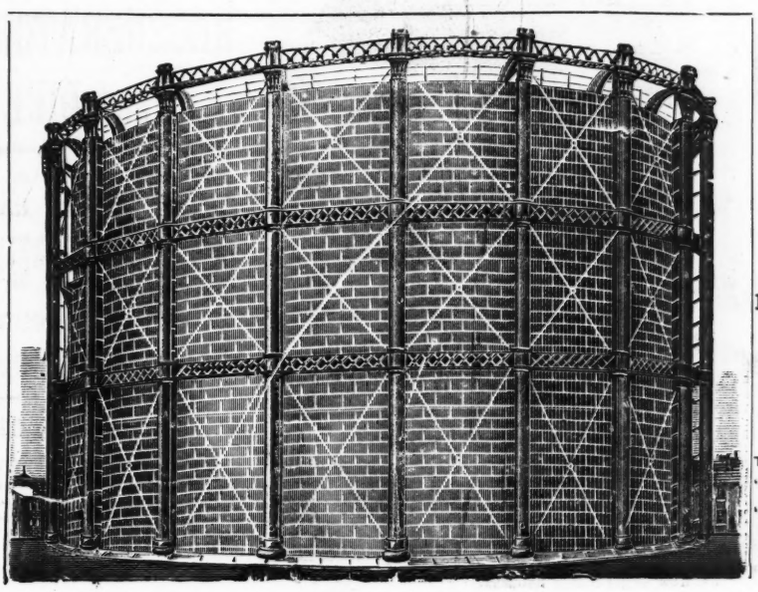

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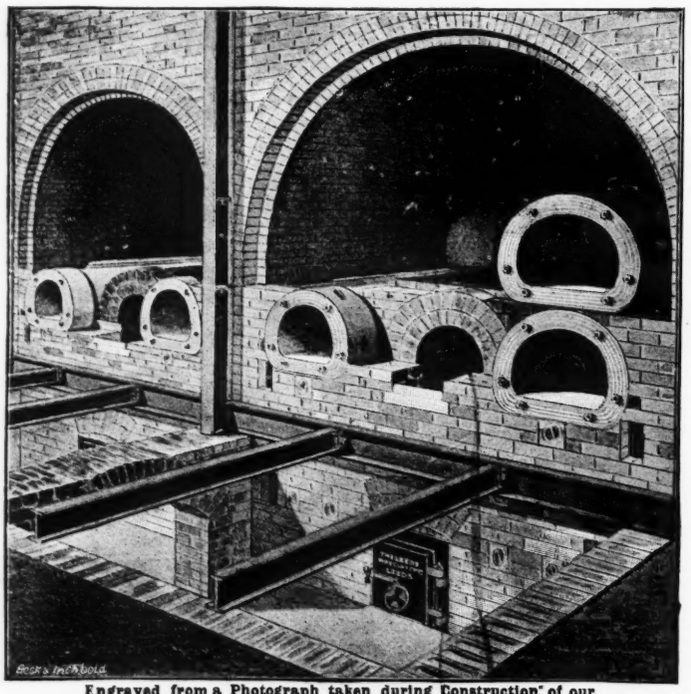

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OF EVERY DESCRIPTION
INCLINED, HORIZONTAL,
REGENERATOR, GENERATOR,
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SHALLOW REGENERATORS A SPECIALITY

MANY INSTALLATIONS.
EXCELLENT RESULTS OBTAINED.

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"WELSBACH SHADOWLESS"

CYLINDRICAL LANTERN.

EFFICIENT. ELEGANT. ECONOMICAL.

SHADOWLESS AND GENERATIVE.
COMPLETELY WINDPROOF.

BREAKAGE OF GLASS
REDUCED TO A MINIMUM.

Hinged top for convenience of Cleaning, &c., with door at bottom for lighting.

Perfect Diffusion.

Glass Cylinders Renewed at Small Cost.

WIDELY USED WITH BRILLIANT SUCCESS ON THE CONTINENT.

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Zinc Top. Glass Cylinder. Cast-Iron Upper and Lower Rims.

A Perfect Lantern for thoroughly Economical and Efficient Incandescent Gas Lighting.

VERY MODERATE PRICE HIGHEST POSSIBLE LIGHTING EFFECT.

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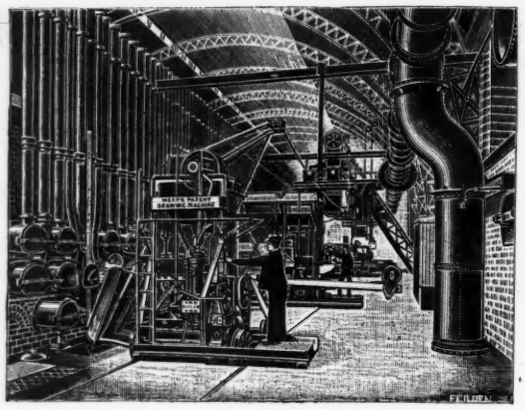
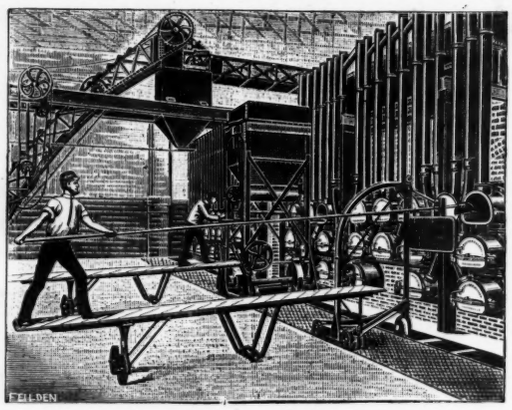


West's Compressed Air Charging and Drawing Machinery for Gas-Retorts.



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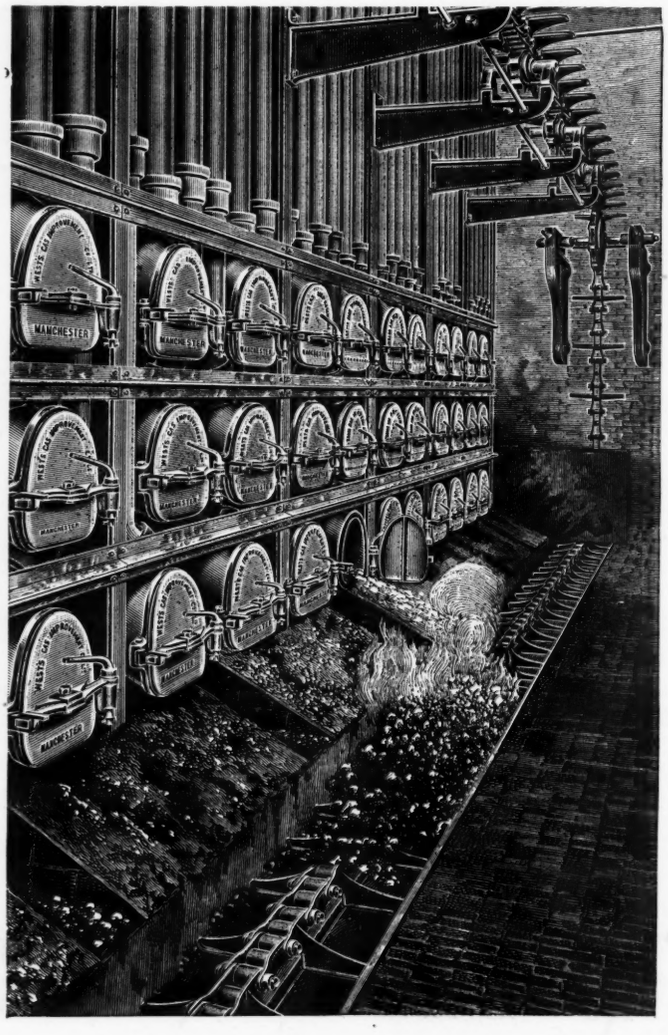

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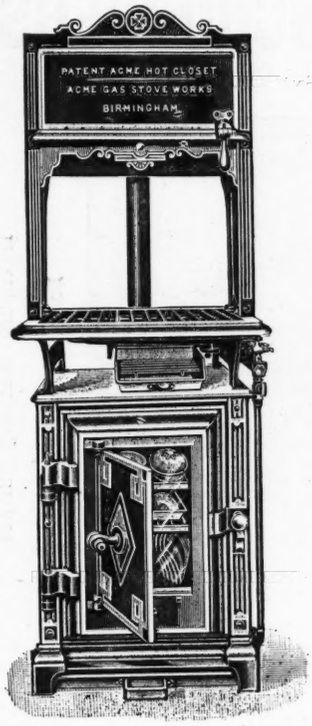
THE LATEST AND MOST SUCCESSFUL DEVELOPMENT IN GAS-STOVES.



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HOT CLOSET & GLASS DOOR,

Has been a long-felt want in all Households, and costs nothing extra to Heat as all the Waste Heat from the Oven is utilized.

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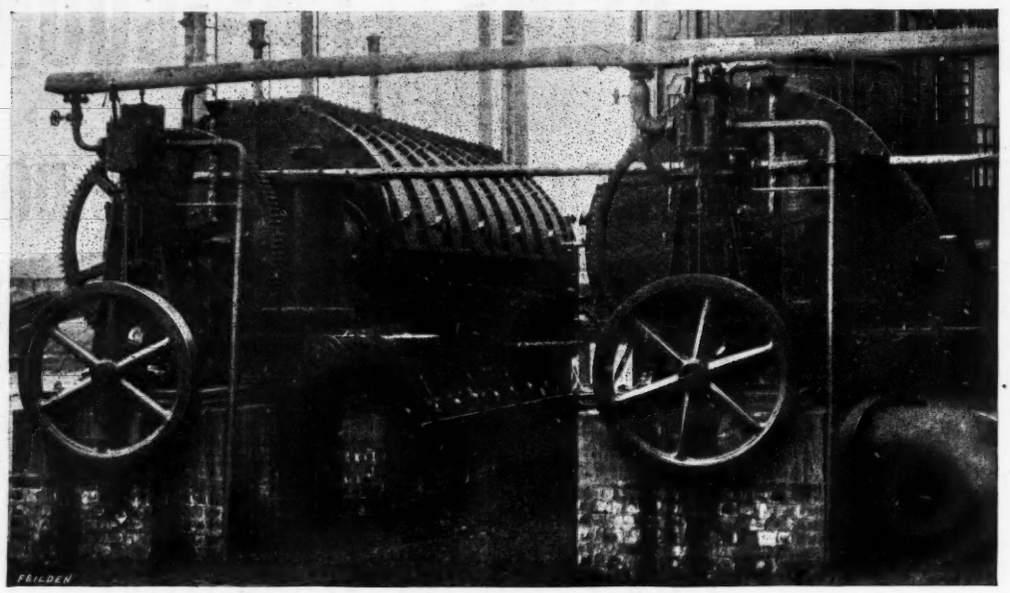
Cubic Feet of Gas per day are now being Purified by

PATENT "STANDARD" WASHER-SCRUBBERS

which extract ALL the Ammonia and a large proportion of the CO_2 and H_2S.

Prevention of Slip of Gas Unwashed

Strength of Liquor Concentrated.



Maximum Washing Surface.

Easy access to interior.

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3 & 4, PALACE CHAMBERS, BRIDGE ST., WESTMINSTER, S.W.

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SOLE IMPORTERS—

ANGLO-AMERICAN OIL COMPANY, LIMITED.

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Belfast	1,700,000	Bordentown, N.J.	125,000	Commercial (Second)	850,000
Belfast (Second)	4,500,000	Winchester	225,000	Commercial (Third)	1,250,000
Brussels	750,000	Shanghai	225,000	Rotterdam	850,000
Brussels (Second)	750,000	Stockport	600,000	Dorking	150,000
Liverpool	3,500,000	Norwich	1,000,000	McKeesport, Pa.	500,000
Liverpool (Second)	4,500,000	Holyoke, Mass.	600,000	G.L.&C.Co., Bromley	3,750,000
Tottenham	750,000	St. Joseph, Mo.	750,000	G.L.&C.Co., Nine Elms.	2,750,000
Tottenham (Second)	750,000	Lea Bridge	350,000	Durham	200,000
Santiago de Cuba	400,000	Lea Bridge (Second)	350,000	New York	4,000,000
Swansea	750,000	Stockton-on-Tees	500,000	Scarborough	800,000
Manchester	3,500,000	Edinburgh	2,000,000	Perth, W.A.	125,000
Brighton	1,750,000	Guildford	350,000	Bremen	550,000
Preston	1,400,000	Brentford	1,200,000	Maidenhead	225,000
New York	1,200,000	Syracuse, N.Y.	850,000	Epsom	225,000
Southport	750,000	Bridlington	150,000	North Middlesex.	150,000
Bath	1,000,000	Middlesbrough	1,250,000	Wandsworth	1,800,000
Newburg, N.Y.	350,000	Croydon	1,250,000	Aarhus	800,000
Newburg (Second)	250,000	L. & N.W. Ry., Crewe	700,000	Falmouth	150,000
Hoylake	125,000	Taunton	225,000	Southampton	800,000

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Hartlepool	750,000	Brussels	1,000,000	Staines	600,000
Utrecht	1,000,000	Brighton (Second)	1,850,000	Commercial (Fourth)	2,000,000
Deventer	150,000	Stockport (Second)	600,000	Dublin (Second)	2,000,000
Portsmouth	1,000,000	Croydon (Second)	625,000	Faversham	200,000
Bournemouth	1,000,000	Maidenhead (Second)	225,000	Birmingham (Swan V'ge)	1,500,000
Aylesbury	150,000	G.L.&C.Co., Beckton	2,250,000	St. Gallen (Switz.)	225,000
Hamburg	1,750,000	G.L.&C.Co., Fulham	1,750,000	Colney Hatch	400,000
Redhill	275,000	Tottenham (Third)	350,000	Southampton (Second)	500,000
Dublin	2,000,000	Sydney (Harbour)	500,000	Tunbridge Wells	1,000,000
Posen	450,000	Sydney (Mortlake)	500,000	Hebden Bridge	200,000
Dunedin (N.Z.)	150,000	Manchester (Second)	3,500,000	Chorley	300,000
Lincoln	500,000	Hull	1,500,000	Liège	1,000,000
Antwerp	1,500,000	Longton	600,000	Stafford	500,000

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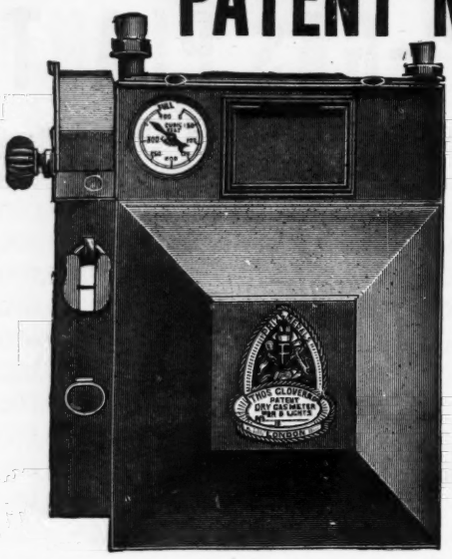

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EDITORIAL NOTES.

The Price of Gas in London.

THE announcement that the South Metropolitan Gas Company have been compelled to raise their price for gas by an additional 4d. per 1000 cubic feet—making the total advance for the season 7d., as against the other London Companies' 6d. per 1000 cubic feet—will probably prove a "staggerer" for those outside critics who have lately been airing their ignorance of the conditions of gas supply in the Metropolis and other places. Whatever else the gentlemen who write in the newspapers and speak at local authorities' meetings about the "scandalous" proceeding of the Gas Companies may be ignorant of—and their ignorance is usually "encyclopædic"—they might charitably be supposed to know that the cost of coal has gone up, with the value of all other materials and labour. Yet we see Professor Silvanus P. Thompson, of the "Technical College, Finsbury (City and Guilds of London Institute)," as he signs himself, writing to "The Times" that "it is nothing less than a scandal that "the Gas Companies . . . should suddenly announce "a rise of prices varying from 10 to 16 per cent." Oh! these Professors! Now, before going farther into this particular professorial utterance, it may be remarked that one of the subjects of technical instruction in which the City and Guilds of London is interested is Gas Manufacture. Will Professor Thompson kindly state what should be the reward of the candidate in the Honours Grade of the Institute examination in Gas Manufacture who should successfully answer this question: "Given a rise in coal "delivered at a gas-works of 8s. a ton net, how would you "put gas into the holders at the same price as if there "had been no such advance?" But Professor Thompson says other very funny things besides. He has made the tremendous discovery that the existing Gas Companies have only a "monopoly" for the supply of *illuminating* gas; and he therefore recommends the creation of a public supply of non-luminous gas, which, as he truly observes, could be rendered luminous by the consumer himself, at will, by the use of napthaline (*sic*) enrichment. How carefully this Professor has got up his facts may be inferred from his statement that non-illuminating gas "can "be supplied profitably at under 2s. per 1000 cubic feet, "or at half the price to which illuminating gas has now "been raised." He thinks there would be no difficulty in getting parliamentary powers for such a venture; being evidently innocent of the treatment the South Metropolitan Company received in Parliament when they merely proposed to give the public all the benefit of emancipation from the tyranny of the photometer.

What is mere aberration in the Professor, becomes twaddle in the common councillor, and sheer idiotcy in the hack journalist. Thus Mr. A. A. Wood, a member of the Corporation of the City of London, speaking on the notification of the Chartered advance, said it was within the power of the Corporation to supply a non-luminous gas, and he believed they could do so at a "nominal price." Finally, the last stage of degeneration of intellectual power to comprehend the situation is exhibited by certain contributors of London news to important provincial papers. One of these says that Professor Thompson "propounds "a plan for turning the flank of the London Gas Com-"panies," and misrepresents the Professor as maintaining that there is nothing in the statutory powers of the Companies "enabling them to exact" a higher price for gas. Another Press luminary thinks that Professor Thompson "again proves his genius" by showing how the oppressed gas consumer can get rid of the Companies' "monopoly." Still, both these newspaper men confessed to entertaining the suspicion that it would not be a very easy matter to "circumvent the Gas Companies"—meaning, to rob the shareholders in such undertakings of their property. One of the London newspapers the other day had a delicious examination story of a candidate who was so weak in his chemistry that the examiner asked him a few simple questions on matters of familiar knowledge, which proved equally embarrassing to the examinee, who was finally driven to protest indignantly that "he didn't come up to "be examined in common sense." Is there a class in this subject at the Technical College, Finsbury?

After all this "flapdoodle," it is refreshing to get Mr. Livesey's plain words on the South Metropolitan position, to the interviewer for the "Daily News," which we have

reproduced in another column. The South Metropolitan Directors, upon second thoughts, have determined to put up their price to 2s. 8d. per 1000 cubic feet, at which the statutory dividend falls to 5 per cent., and the employees' share of profit vanishes. This movement therefore entails some important and interesting consequences, as Mr. Livesey freely admits. The mere facts, as he states them, should effectively dispose of the absurd suggestion that the increases of price are so much wantonness on the part of the Companies. We observe that he blames the Gaslight and Coke Company for not offering a reason for their increase, which act of courtesy to the public his Board are careful to show. It may be doubted, however, whether anything the Gaslight and Coke Company could have advanced would have served to sweeten the pill. It is reported that they did mention the enhanced cost of coal in communicating the intelligence to the City Corporation; but the explanation did not mollify the Common Council in the least degree. The South Metropolitan Company are differently situated, and constituted. Their Workmen-Directors now form a valuable bond between the Board-room and the working staff, and indirectly with the consumers also. All South London relies implicitly upon the good faith and ability of the Directors and management of the Company; and there is not a householder in the district but has the best reason for knowing that coal is dearer than it was. The interviewer of the "Daily "News" spoke the practical wisdom of the people when he confined his last inquiries to the one question—how long this period of dear coal is likely to last. There is no denying the fact. In reply, Mr. Livesey advertises himself as playing the game with his cards on the table. He has only bought coal for six months. Let the coalowners make as much of the admission as they can. Of course, they knew it before; so that it is not news to them. Meanwhile, Mr. Livesey is content to watch and wait. All the professors in the world will not frighten him. He knows their quality too well. They are not, as a rule, persons who have any "practical knowledge and experience in the manufacture "and supply of gas;" and he has.

The Irish Appeal Court on Steam-Rollers and Gas-Mains.

A VERY important decision has been given by the Irish Court of Appeal upon the Dublin steam-roller case.* It will be remembered that the Master of the Rolls, before whom the case originally came, granted an order on behalf of the Alliance and Dublin Consumers' Gas Company restraining the Dublin County Council from using a steam road-roller in such a way as to injure the Company's mains. The County Council appealed. The chief issue between the Company and the County Council was essentially the same as that in the St. Mary Abbotts case—as to which of two concurrent rights should prevail. The result has also been the same; only, if anything, the judgment of the Irish Appeal Court is stronger than the earlier English one, and it is much stronger than that of the Irish Master of the Rolls. Lord Justice Fitzgibbon, in delivering the unanimous judgment of the Court, said that a Highway Authority unquestionably had a right to maintain the roads by all reasonable means, and also to advance with the times in the methods by which they discharge their duty to the public. On the other hand, a Gas Company also have a concurrent right to the use of the roads for their own lawful purposes, and are to be protected in the enjoyment of their right reasonably and properly—likewise in accordance with the fashion of the times. In the case in point, pipes properly laid in the roads were broken, and broken by a steam-roller. This being so, the Gas Company sought their remedy from the County Council, as owners and users of the steam-roller, together with an injunction as a precaution against repetition of the mischief. The question for the Court was accordingly concentrated upon the point as to whether the protection of an injunction ought to be given to pipes of the Gas Company that had been laid, properly in respect of the conditions prevailing at the time, before steam road-rollers were heard of in the land. Inasmuch as the effect of an affirmative answer to the question would be to stop steam road-rolling altogether in many places, the Court was very careful to clear the issue, and to narrow it down to the smallest possible bearing. Thus the judgment is extremely emphatic as regards what it will not give to the Gas Company. The Company are bidden to recognize the use of steam-rollers as perfectly legitimate, and are ordered to so lay their pipes that this means of making and maintaining the roads may be safely used. With this proviso, an injunction is issued "against "using any steam-roller on any road under which the gas-"pipes of the plaintiffs have been laid so as to break or "injure any pipes then properly laid under such road, "regard being had to what at the time of the laying of "such pipes were the ordinary traffic and the then "reasonable means of repairing and maintaining roads." This is good sense, as well as sound law. The judgment did not conclude without a snub to both parties for their autocratic style of asserting what they believed to be their respective rights—the Gas Company, to the first consideration in regard to the treatment of the roads in which their mains lay; and the County Council, to the power of running steam-rollers anywhere, utterly regardless of what might happen to the gas-pipes. Nevertheless, the Gas Company get their costs.

* The judgment of the Court was briefly given in the "JOURNAL" last week. The full text is unavoidably held over till our next issue.

Trade Unionism in All Its Glory.

A GOOD many easy-going, amiable people, who live comfortable lives under the protection of the police and in accord with neighbours submissive, like themselves, to the canons of polite society behaviour, are disposed to think favourably of the "principle" of Trade Unionism. They applaud the arguments of those public speakers and writers who contend for the right of working men to combine, or organize themselves, for their own protection and advantage, and profess themselves at a loss to understand why so many otherwise irreproachable employers, and periodicals like the "JOURNAL," maintain a position of absolute hostility to Trade Unionism in practice. This is, of course, the point upon which we and the admirers (from a distance) of the theory of Trade Unionism, split. They see the theoretical side. They read arguments about the idea. More rarely, they may happen to meet "Labour" representatives upon public bodies; and they usually find them the mildest-mannered men that ever cut a trade to pieces. Still the "JOURNAL" and many heads of national industries persistently decline to "recognize" the Trade Unions, as the phrase goes, and even declare that this resistance is as much in the interest of the workmen themselves as it unquestionably is the imperative duty of all the true friends of industry. Why is this? The answer is simply that there is all the difference in the world between the theory of Trade Unionism and the practice thereof. Theoretically, it is a beautiful dream of good fellowship and mutual helpfulness among the followers of every trade, which would gladly embrace the employer if he would only have it so. Practically, it is a grinding tyranny, subversive of the liberty of the subject which is every Englishman's birthright; resting on a system of violence and terrorism, and inspired with a spirit actively inimical to the prosperity of every trade and calling infected by it.

There is no excuse for mincing words in describing Trade Unionism as it is in practice. If any independent person entertains the faintest doubt that working Trade Unionism is what we declare it to be, let him read the plain and simple story in the "Leicester Daily Mercury" of the 26th ult., of the last days and the distressing death of Thomas Broadwell Shelton, a shoe-laster. The world of industry is often assured that all will be well when trades are fully "organized," and when the Trade Unions are properly "recognized" throughout the country. Then the fangs of Capital will be drawn, and the working population will get their deserts. Well, there is no trade more completely organized than the shoe industry of Leicester; and this is how it works out. Shelton was a good workman, for whom his employer entertained the highest respect —"admiration," he said at the inquest. He had left this particular employer for a few months, for another job with a firm which failed. His successor did not give satisfaction, and the shop foreman had instructions to discharge him. Before this order was acted upon, the foreman met Shelton, who was out of a berth, and asked him if he would return to his old job, as the new man was unsatisfactory. Shelton accepted the offer, and the other man was transferred to another job for a week, when he was given a week's notice to leave. Not unnaturally in the circumstances, the man under notice told Shelton that he (Shelton) had got him his discharge; whereupon Shelton replied that, if that was so, he would give a

week's notice himself. And after all this, the other man reported Shelton to the Union officials "for doing too "much work for his money, but did not say any- "thing to the officials about deceased getting him dis- "charged." For this heinous offence—the one unpardonable crime in the Trade Union penal code—Shelton was summoned to answer before the Vehmgericht of his order. He did not attend. His wife said that he was "much put "about by the letter" from the officials; and he went out and cut his throat, instead of standing his trial—leaving a pitiful note to his wife explaining that for the rest of his life he should be "spotted" for what he had done.

"There's the rub," as another prospective suicide once expressed it. This free-born Briton, of the race that vociferously shouts its contempt of slavery, preferred death to the alternative of being "spotted" at the instigation of a Unionist. The tale is beautifully complete. The model Trade Unionist, the man to whom the officials give heed, is the man whom the employer does not want. This man goes about to public-houses glorying in the fact that a better workman than himself has cut his throat "all through "him," and ought to have done it years ago. Whereupon, the Coroner asked what was this man's grievance against the dead? Answer: "He did not do me any more harm "than to anyone else in the trade." This is Trade Unionism in practice. To be "spotted"—that is the modern form of torture devised for those workmen who dare to do with their might whatsoever their hand findeth to do. Very simple, too; and trifling, perhaps, in the eyes of the gentleman living in a nice villa residence standing in its own grounds, such as a town councillor, a Justice of the Peace, or a Member of Parliament should have at the very least. But think of what it means in a street of artizans' dwellings, or in a model tenement. How would the refined amateur of Trade Union "principles" like to experience the treatment there?

Second Reading of the Companies Bill.

THE House of Commons, like the mediocre boarding-house described by Dickens, "can do it when it likes;" and it "did it" very well this day week, by discussing, reading the second time, and sending to the Grand Committee on Trade, the Companies Bill. The nature of the measure has already been explained in these columns; and it is only necessary to remark now that further examination of the Bill has enlisted stronger support for its provisions in and out of Parliament. As the President of the Board of Trade observed in moving the second reading, everyone must admit the importance of the questions raised by the measure, having regard to the enormous amount of capital invested in public companies and the advantages that are unquestionably derived from this principle of trading enterprise. No one disputes the beneficial operation of the joint-stock system as a whole; but it is equally incontestable that many abuses have crept into the practice of company promotion and administration which it is desirable to prevent for the future. At the same time, care is necessary to avoid injury to the tree by the process of cutting out the diseased growths. Fortunately, reform of company law by Act of Parliament is possible for the reason that the original laws themselves are of parliamentary manufacture. Consequently, those who set about the amendment of company procedure by the way of a statute have the supreme advantage of being on the same level as the subject of their attentions. It is a question of homœopathic, or at least of homogeneous, treatment. But very different is the case (say) of the people who desire to make everybody sober, or virtuous, or brave by Act of Parliament. This is as vain as an endeavour to "hit the nominative case "with a stick." A director, however, is a creature of an Act of Parliament; and, accordingly, he can be reached by any and every Act of Parliament which we like to throw at him. The Government Bill does not go a whit too far on the way of reform; being almost exclusively aimed at what are generally recognized as abuses of the existing Acts. A good deal of the real law of companies has been made by the Courts to which has fallen the duty of applying the Acts; and it is impossible to praise too highly the manner in which this service to the community has been rendered. The present Bill will strengthen the hands of the Judges, and at the same time render a good deal of litigation of the usual nature unnecessary. It is one of the most important commercial measures of the session, and of this Parliament; and it is gratifying to note that it was warmly welcomed in all parts of the House by representative merchants, financiers, and lawyers. It is a small point; but it is impossible to read the reported debate without being struck by the extremely limited and technical sense in which the word "qualification" is used throughout as applied to directorship. It means, of course, the possession of a specified number of shares in the company and nothing more. One cannot help wishing that it were possible to enlarge the meaning of the term, so that when a director is said to be qualified for his position the word might be understood in its full, ordinary sense. But, as the case stands, the distinction between the director and the manager of a company is that whereas the former need only be qualified, the latter should be competent also. Not, by any means, a distinction without a difference!

WATER AND SANITARY AFFAIRS.

LEAVING out of consideration the unpleasant meteorological conditions which prevailed at times on Monday last week, the visit of inspection paid by the members of the Staines Reservoirs Joint Committee to the works which are now in course of construction by them between Hampton and Bell Weir on the Thames, of which an account appears elsewhere, must have been productive of much satisfaction. Seeing that the distance between the two points named, which will be connected by an aqueduct, is rather more than seven miles as the crow flies, and that the two storage reservoirs at Staines cover an area about three-fourths that of the City of London, it is surely evidence of good progress to find that, in the two years and two months which have elapsed since the first turf was cut by the Chairman of the Committee (Mr. E. Boulnois, M.P.), enough work has been done to justify the confident hope that by this time next year the smaller reservoir will be ready for water to be pumped into it. Perhaps this should not be a matter for surprise when it is remembered that the Contractors are Messrs. John Aird and Sons, whose resources, whether of men or plant, are fully adequate to any works of this character, be they upon the banks of the Thames or of the Nile. No doubt the site was favourable. Providence, as Mr. Boulnois remarked at the luncheon, really seemed to have designed Staines as an auxiliary to the water supply of the Metropolis; the land in its neighbourhood being specially suitable for the construction of large reservoirs, while it could scarcely be used for anything else. The ground is level, the London clay lies a little below the surface, and there are upon the spot all the necessary materials. It was therefore a happy inspiration—or should we not rather say an exhibition of engineering skill?—which led to its selection for the works which Mr. W. Hunter and Mr. R. E. Middleton, the Joint Engineers to the Committee, are carrying out. The bounteous Thames flows close by, and the provision, as needed, of receptacles for the storage of its surplus waters seems, therefore, a more feasible solution of the London Water Question than the construction of gigantic reservoirs in Wales.

Of course, the London County Council do not agree with this; nor does Sir Alexander Binnie. He last Thursday told the Worshipful Company of Turners, who have conferred upon him the honorary freedom and livery of the Company, "in view of his extended service as En- "gineer to the London County Council," that it was a "disgrace" to the Metropolis that it had not taken control of its own water supply; and his remarks appear to have been received approvingly by his fellow-liverymen. Moreover, he is satisfied that the time is not far off when resort will be had to some distant source of supply. We fail to see where the "disgrace" comes in. London is not so badly supplied with water by the Companies that the inhabitants are clamouring loudly for municipal control; and even if they were, we question whether they would select the body with which Sir Alexander Binnie is associated as the one to be entrusted with this important service. At present the Companies send out daily about 34 gallons of water per head of the population, at prices which are assessed on as equitable a basis as possible. Surely this cannot be called an inadequate quantity; and there is not much likelihood of it being reduced owing to the growth of the population. The works now in progress at Staines will, when completed, give London an additional supply of 35 million gallons of water a day; and as the two reservoirs there will contain 3300 million gallons, a store will be at hand which may be relied upon to furnish the quantity

named continuously for more than three months at a time, supposing not a drop of water could be drawn from the river. In view of this fact, and of the probability of this additional supply being available in three years at most, we confess to not sharing Sir Alexander Binnie's opinion that resort to a distant watershed will be necessary in the near future. In the valleys of the Thames and Lea, and also in Kent, there are untapped sources of water. Let these be utilized to their fullest extent before enormous expense is incurred in going to Wales.

The paper read by Mr. F. J. Bancroft, at the recent meeting of the British Association of Water-Works Engineers, on "The Rating of Water Undertakings," as reproduced elsewhere, is an intelligent and thoughtful composition. Several works have been written on the assessment of gas, water, and similar properties; but most of them deal with the question with such prolixity, that the average gas and water engineer or secretary, burdened as he generally is with multifarious duties, can ill spare the time to apply himself to their study with the closeness which the complexity of the subject demands in order to gain useful knowledge. For brevity and clearness, the little book by Messrs. Newbigging on the valuation of gas and water works is the best so far published. But Mr. Bancroft's paper, dealing alone with water-works, is commendably concise; and yet his method of treating the subject has given to it a rounded completeness. After having heard the paper read, and having again carefully perused it, the impression it has left on our mind is that the author has applied himself assiduously to the fathoming of the mysteries of the assessment of water-works, and that he has thoroughly mastered the principles upon which valuers now usually, but not always, proceed in assessing the rateable value of such undertakings. But in the application of these principles, one gets such incomparable results, even allowing for differences of condition, that, without fear of being charged with exaggeration, we dare say that the rating expert is not yet born who can safely avow that he is a thorough master of the entire business—save, of course, from his own point of view. A system, or set of principles, which admits of an expert undertaking the valuation of property at a percentage on the highest increased assessment that he can maintain is rotten, and can have no firm foundation; and the sooner a change is made and disputed points settled, so as to bring about greater uniformity and equity throughout the land in this respect, the sooner will the proprietors of such undertakings as gas and water works be made happier than they are under present circumstances. But we fear that time is not yet. However, reformation is not obtained without agitation; and the time is opportune for pressing the question upon the attention of those bodies who can take the initiative in bringing it before the Legislature. Admittedly, there are difficulties in the way of reducing rating to an exact science, or to securing absolute uniformity. This cannot be expected, and nobody asks for it—indeed, it would be ridiculous to attempt to attain such a degree of perfection. But something like consistency is desirable, and is demanded; and we fail to see that there are any insurmountable obstacles in the path to that goal.

As already stated, Mr. Bancroft's paper commends itself to us in the first place for its clear enunciation of the principles generally applied to the valuation of such property as water undertakings. This part of the paper laid itself open to little criticism, excepting in one regard, and that was the span of useful life that the author allots to the various parts of water-works and their equipment in connection with the deductions to be made for renewals. Out of the half-a-dozen divisions into which he separates the works and plant, only two were seriously questioned; and those were service reservoirs and mains. The lengths of life assigned to these were considered too short; and instances were quoted of remarkable longevity. In giving only forty years to reservoirs and thirty years to mains, it certainly seems to us, guided by instances within our own knowledge, that the author hardly does justice to well-constructed work. But in other respects his figures stand undisputed as being fairly good averages. The importance to water authorities of the decision which confers upon reservoirs the legal right to inclusion within the favoured *genus* of rateable subjects described generally by the Public Health Act, 1875, as "land covered "with water" was duly recognized by the author. But it raised the point as to whether roofed reservoirs came within the same category. The author would not hazard an opinion; but we are inclined to think that the roof would debar a reservoir from participation in the relief which the Courts have granted to open reservoirs. But opposed to this opinion we have the fact that three covered reservoirs at Lewes are only rated at one-fourth their net annual value. Another direction in which there might be reduced rating is submitted by Mr. Bancroft. Railways are charged on one-fourth their value; and the term "railways" has been held to include the line, embankments, turntables, and sidings. The author contends that here there is sufficient ground for asking that such property as gas and water pipes should be rated on the same basis. Off-hand, we cannot see any valid reason why the two things should not be regarded as being somewhat identical for the purposes of rating. We say "valid reason," because, in such matters as this, small arguments may, and can, be advanced on both sides of the question; and advantages are frequently lost through trumpery distinctions. We will suggest one little difference that might be regarded as a sufficient bar to the bestowal of such a benefit as Mr. Bancroft would like to secure. The railway lines and the water-pipes may be taken as identical in so far as they are both means of conveyance. But there, it must be confessed, all similitude ends; for in the case of the former, between the stations there is only an intermittent beneficial use, while in the case of the water-mains—the flow of water being continuous—there is a perpetual one. This is the only difference that, for the moment, occurs to us which might have an adverse bearing on the matter; but whether it is sufficient to deny to gas and water companies the privilege that Mr. Bancroft claims may be seen hereafter. We hope it is not.

In the concluding part of the paper, the author introduces the proposition of Mr. H. Wilkins, the Secretary of the Lambeth Water Company, to make gross profits the basis for rating. We are afraid the rating authorities would prefer something a little more stable, or less fluctuating, than profits as a foundation; and even assuming they were taken as a general basis, it appears to us that it would operate unequally as between municipal and company owned works. Moreover, if the Parliamentary Committee who are inquiring into the question of municipal trading should lend a favourable ear to the London Chamber of Commerce, and other opponents, local authorities may not in the near future be in the position to earn profits out of their customers for application to the relief of the rates, and so the proposed basis to a large extent would disappear in their case. The paper and discussion form good reading. They are both interesting and instructive; and, taken together, they supply a strong indictment of the present system of rating (systems would be a better term) in this country.

THE GEORGE ERNEST STEVENSON MEMORIAL FUND.

Various circumstances have tended to delay any final steps being taken to close this fund; but we are now asked by the Hon. Secretary (Mr. H. E. Jones, of the Commercial Gas-Works, Stepney) to state that it is the intention to call together the Committee very shortly to definitely determine what form the memorial shall take. The subscriptions so far promised (and in many cases the amounts have been received) are shown in the accompanying list; and Mr. Jones would be glad to hear of any further contributions to the fund, so that the Committee may know the exact amount they can rely upon.

List of Contributors.

	£	s.	d.
John Aird	5	5	0
Joseph Aird	5	5	0
"Anonymous"	10	0	0
J. Ferguson Bell	1	1	0
T. Berridge	1	1	0
C. E. Botley	2	2	0
C. F. Botley	1	1	0
A. E Broadberry	1	1	0
C. C. Carpenter	3	3	0
J. Cash	3	3	0
"Civil Engineer"	10	0	0
Davis Gas-Stove Co.	1	1	0
George Dawson	10	0	0
A. Dougall, Junr.	3	3	0
W. Foulis	2	2	0
W. Doig Gibb	2	2	0
T. Goulden	2	2	0
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J. W. Helps	2	2	0
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H. H. Jones	2	2	0
F. H. Jones	2	2	0
S. H. Jones	1	1	0
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	£130	9	0

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 42.)

LAST week, being the closing week of the half year, imported a little more activity of a sort into the Stock Markets; but it was not of a purely beneficial character, being largely composed of professional operations. It had, however, the result of creating some movement to diversify the reigning stagnation; and the flatness which prevailed in the earlier portion of the week gave way later on to some little fluctuation. It can scarcely be said that there was any general tendency—the various issues moving, when they moved at all, in response to special circumstances affecting them. The result is that changes in quotation are pretty equally balanced; there being perhaps as many rises as falls, with nothing considerable either way. In the Money Market, there was the usual demand in connection with the close of the half year, which was met without difficulty; and discount rates ruled easier. Business in the Gas Market continued to flow at a very moderate level; and there was never at any time a sign of its rousing into real activity. It ran, too, very much in a groove, there being far more transactions in Gaslight issues than in all the rest put together. It almost goes without saying that prices are uniformly lower, owing to the announcements in all quarters of an increase in the charge for gas; but, singularly enough, the solitary exception to the general downward movement is in a Gaslight issue—a quarter which has incurred the most heckling over the rise. The ordinary stock was moderately dealt in every day; and after opening at par, it fell away steadily until 97 was marked more than once, and the quotation was lowered a couple of points. The maximum stock was flat; but the preference for some reason or other advanced a point. South Metropolitan was quiet, and had to give way both in the ordinary and in the debenture stock. Commercial lost the advance it had scored the previous week. In the Suburban and Provincial group, business was almost *nil;* but there was a big drop in Alliance and Dublin without any transaction marked in it. Moderate business was done in the Continental division, almost wholly confined to Imperial, which was weaker and receded. The remoter undertakings offered no feature of interest. The Water Companies were not quite so firm as they had been; and two or three of the quotations were marked down, but only to a very moderate extent.

The daily operations were: Business in Gas was quiet on Monday; and prices were unchanged, but for a fall of 1 in Imperial. There was rather less doing on Tuesday; and prices were flat. Commercial old relapsed 5, Imperial 2, and Gaslight ordinary and South Metropolitan 1½ each. Wednesday was much the same—Alliance old fell 2½, and the new 1, Commercial debenture 1½, and Gaslight ordinary ½. Transactions on Thursday were moderate at unchanged figures. Friday was about as active, and no more. Gaslight preference rose 1; but South Metropolitan debenture fell 1. In Water, East London dropped 1½, ditto debenture 1, and Southwark preference 2. Saturday was quiet and unchanged.

ELECTRIC LIGHTING MEMORANDA.

The Decision of the Committee on the Electrical Power Bills—The Case for the Bills—A Big Experiment—Dublin Electricity Supply in Parliament.

SIR JAMES KITSON'S Committee gave their decision last Thursday on the grouped electrical power Bills. This was formulated in two stages. The first was a declaration that a local authority which undertakes and is prepared to give a full and ample supply of electrical energy for all purposes to consumers within its district ought not, without its consent, to be required to give facilities for the supply, within its district, of electrical energy by other undertakers. But if a local authority is unable or unwilling to provide, on reasonable terms and within a reasonable time, a full and adequate supply of electrical energy for any purpose to any company or person applying for the same within its district, such company or person should be at liberty, after notice to the local authority, to obtain their supply from other authorized undertakers; and the local authority should be required to give all necessary facilities for this purpose. Any difficulty arising out of this arrangement to be settled by arbitration as provided by the General Acts. This pronouncement was characterized as vague by some of the Counsel engaged in opposing the Bills; but Mr. Balfour Browne immediately appreciated it as tantamount to an acceptance of the preamble of the South Wales Bill, which was being opposed by the four largest local municipalities on general principles. Accordingly, he gave up futher opposition to the preamble, and his example was generally followed. On the following day, the Committee completed their declaration by announcing that, subject to the principles stated above being embodied in clauses, the preambles of the South Wales, County of Durham, and Lancashire Electrical Power Bills were proved to their satisfaction; while the preamble of the Tyneside Bill was not proved.

Thus ends an inquiry of the first importance, on several distinct and independent grounds. The result shows, in the first place, that, in the opinion of this strong Committee, the general case for electrical power generation and distribution on the large scale, taking advantage of what in this country stand for natural facilities for cheap working, which the Joint Committee had already approved in principle, is fairly supported in the concrete by the best of the schemes submitted to them. They believe that in certain extensive areas, in different parts of the country, electricity-in-bulk generation and supply is both feasible and likely to prove advantageous to the community at large. This is a great step in advance of anything that had been proved before. Secondly, they have assigned definite bounds to the right of pre-emption claimed by local authorities under the terms of the Electric Lighting Acts in respect of all possible electricity supply within their areas. This is an even more important declaration than the other. Municipal corporations have sought to force upon the Electric Lighting Acts applications which these statutes will not bear, and which were not in the mind of Parliament at the period when they became law. These Acts apply to electric lighting only, in essence; and they are also parochial, so to speak, in scope. It was never intended that because a local authority had spent, or even might at some time or other propose to spend, a few thousands of pounds in providing public electric lighting for a described area, therefore it might block the way of undertakings formed on a scale then unheard-of for supplying the cheapest possible electricity, for all purposes, over a wide region of which the municipal scheduled area would be only a small fraction.

It stands to reason that municipal electricity supply, with very few exceptions, cannot be produced or sold so cheaply as a big concern, doing the business in bulk, and not tied to sinking funds or hampered with antiquated plant, can provide the same service. Why then should the public, and industrial users of electrical power, be condemned to pay the municipal price? That is the question which the House of Commons Committee have now disposed of. Municipal "enterprise," commonly resulting in the production, on a small scale, of dear electricity, is not to be the dog-in-the-manger. This order of municipal trading has its limits; and the Committee have indicated their nature and location. No public body, working with public funds, could venture to do what any and all of these Electrical Power Companies must do, if they are to do anything at all beyond raising money from the public. The imputation of swindling being avoided, however—and many of the names appearing in conjunction with these projects render the suggestion one to be scouted—what is it that the Companies must do to justify their existence? They must launch a huge amount of capital upon a sheer experiment, which may or may not turn out satisfactorily, but which, at any rate, cannot be tried in any other way. In the course of this experiment, they must be prepared to ruthlessly "scrap" machinery and plant costing very large sums of money, on the unexpected advent of something better. Their shareholders, too, must be resigned to wait for their dividends for years, and perhaps see charge upon charge put before them on the Company's property. In the end, the public may get cheap electricity, in any quantity. Electric tramways and railways may run across the country in all directions; the smoke factory chimney may cease to blacken the air of towns; electric motors may do all manner of work; the electric light itself may be reduced to only three or four times the price of gas. But there is only one way by which all this can possibly be done; and it is not the parochial way contemplated by the Electric Lighting Acts.

There is something essentially funny about the recent parliamentary proceedings in regard to the electricity supply of Dublin. It is generally understood that the Irish race has a genius for politics—unfortunately for themselves, as some would say. Certain it is, however, that what is called politics gets mixed up inextricably with all Irish business of a public character; and Dublin electric lighting is no exception to the usual run of these things. Moreover, underneath most of this description of politics is somebody's personal interest. It seems to be conspicuously so in the present instance. The Corporation of Dublin have their own views and proposals anent electric lighting; but unhappily these clash with the plans of the Dublin Tramway Company, and the supporters of the latter are not the men to leave a stone unturned to get their own way. Accordingly, there have been great "ructions" over the whole affair; and in the event that shining light of the Irish contingent in the House of Commons, Mr. T. M. Healy, carried the Tramway Company's Bill against all that the Corporation could do to defeat it on the Report stage. The debate is highly interesting reading, and we regret not being able to report it in full.

Distillation of Coal Tar in Spain.—According to the "Revista Minera," there is room for the development of the coal tar industry in Spain. In Madrid there are some small works, which are employed mainly in the production of creosote for the Spanish Southern Railway, and pitch for making compressed fuel. In Seville, coal tar is distilled on a very limited scale. The gas-works in Catalonia produce from 3000 to 4000 metric tons of tar, some of which probably is distilled. Messrs. Burt, Boulton, and Haywood, the well-known English tar distillers, have works in Bilbao. The present entire production of tar in Spain is scarcely 16,000 metric tons; and the above-named publication considers it would not be difficult to increase this four or five times, as the dust of schistose coals, bituminous schists, and peat could be distilled solely to obtain tar.

HERR W. VON OECHELHAEUSER AND THE GERMAN GAS AND WATER ENGINEERS.

THE address recently delivered by Herr W. von Oechelhaeuser, the General Manager of the German Continental Gas Company, to the Association of German Gas and Water Engineers, of which a practically full translation was given in the "JOURNAL" for June 19, p. 1640, deserves much more careful perusal and fuller consideration than it may possibly have received, owing to the bulk of matter contained in that issue. The speaker, whose address displayed a thoroughly broadminded and genuine liberalism—we use the word in its wide and non-party sense—combined with the strong practical sense of a man of affairs, dealt with two subjects of the greatest importance to those who (like Herr von Oechelhaeuser) are responsible for the success of gas undertakings: First, the social and moral duties of employers to their workmen; second, the need for better technical and intellectual training for those destined to engage in the practical work of the gas industry.

These subjects were suggested for consideration by the fact that, after the festival of the Berlin Technical College last autumn (which, as we at the time remarked, constituted the apotheosis of technical education in Germany), the German Emperor referred to the fact that, by their many associations with labour, workmen, and industry in general, the technical colleges are in a position to exercise widespread influence on social and moral relations, and possess great opportunities for stimulating and influencing others. It is a remarkable testimony to the real and actuating force of the Emperor's personality that his speech to the college principals—so far from being taken as a mere matter of ceremonial courtesy or platitude—should, after the lapse of some months, be recalled to the attention of an assembly of practical men, and, moreover, be referred to by Herr von Oechelhaeuser as a pronouncement which "should lead every Association of German engineers to revise its programme, and to act hereafter in accordance with the spirit of the Emperor's words." In order that his address should be of the greatest possible practical value to such of his hearers as might be moved to action in the matter of more fully and thoughtfully carrying out their social duties to their workmen, the President had previously caused to be addressed to the members of the Association, at home and abroad, questions directed to ascertaining what arrangements were already in force at the different works for the benefit and social welfare of the workpeople, "apart from the ordinances and requirements of the law in this respect."

The result of these inquiries showed—as might have been, and probably was, anticipated—that, although much remains to be done for the social welfare of the employees at both municipal and private gas and water works, yet there are already in operation many admirable arrangements deserving of wider recognition and adoption. The President referred to many of these beneficent, and (through the better health and contentment of the employed) ultimately profitable schemes; and the value of this portion of his address, both to his hearers and to those—we hope they will be many—who shall read the report, lies in its suggestiveness. There are few managers, we trust none, at whose works no single one of the hygienic or morally beneficial arrangements touched upon in the address is in force. But while, as the President truly said, no one would expect all these schemes to be everywhere adopted—local necessities varying with local conditions—many of them only need to be brought to the consideration of employers to be self-commended and put into operation.

We cannot here refer in detail to any of the arrangements brought together and commented upon by Herr von Oechelhaeuser, who grouped them under two heads: Those designed to render the hygienic conditions of labour as favourable as possible to the workmen; and those whereby bodily toil may be reduced through the adoption of labour-saving appliances. As is truly remarked, the health of gas workers is on the whole good; the buildings in which they are employed being well ventilated and the processes practically free from danger. But there are many gas-works where greater attention might with advantage be paid to the need for stokers' baths, and eating and reading rooms. In this respect the new works at Charlottenburg may be described as model, while our own Metropolitan works have little to learn and much to teach. To merely enumerate some other points: Workmen's dwellings, good service bonuses, sick and pension funds, summer holidays, workmen's institutes and clubs (even skittle alleys), social evenings for the men and their families—surely this is a list which "presents a cheerful picture of social efforts which [perhaps] can nowhere be introduced as a whole, but which should stimulate us to put them into practice as far as possible in our respective spheres of action."

As to the latter part of the address, devoted to the subject of technical education, we can only now so far deal with it as to say that it is of much interest to English readers, though specially directed, of course, to the circumstances existing in Germany. We may also remark upon the fact that, while we are having it so frequently impressed upon us by English writers and speakers that we lag hopelessly behind our German competitors in the matter of technical knowledge, we find Herr von Oechelhaeuser upbraiding his own countrymen for possessing, on the average, less technical knowledge than Englishmen or Americans. The paradox is, however, apparent, not real. The average Englishman, whose vocation requires for its pursuit little or no technical training, very possibly—we think most probably—possesses a wider acquaintance with scientific subjects than the corresponding average German. But that avails us little beside the fact that the German engineer or manufacturer who requires for the successful prosecution of his business the best technical knowledge, receives a more practical and thorough training in technical matters than his English *confrère*. What we need is not more people with a smattering of scientific knowledge of no real practical use to them or their country, but a greater number of men carefully and specially trained in the technology of the particular practical business they are destined to conduct.

THE HOUSING OF THE WORKING CLASSES BILL.

IT is impossible to pass over without notice the sound piece of work done, without show or fuss, on Monday of last week, by the House of Commons. On that day, the Government Bill for facilitating the provision of improved housing for the working classes of towns, chiefly by enabling the local authority to purchase land for the erection of dwellings outside its own area, passed through Committee after an ample, and on the whole well-intentioned, discussion. Not the least satisfactory feature of this proceeding was the discomfiture of those who had slily hoped to make party capital out of the measure or its limitations. After having completely neglected the matter until the present Bill was brought in, certain politicians made frantic efforts to work up an agitation against the sponsors of the measure, because it did not propose to do this, that, and the other; and they fondly imagined they had injured its prospects of passing through the House of Commons by stigmatizing it as a puny Bill just touching the fringe of a huge question. It must have come as a great surprise to these suddenly interested amateurs of the subject, to learn that local authorities already possess extensive powers to deal with insanitary dwellings in their areas—powers which as a rule are allowed to remain a dead-letter. A circular just issued by the Local Government Board states the nature and extent of these powers, showing clearly that it is not Parliament that has been neglectful of the needs of the people in this respect, but their own representatives in local government, who have been unwilling to make full use of the sanitary laws.

One thing this old body of Public Health Law did not provide for—it did not contemplate the provision *de novo* of dwellings for the working classes, as accommodation required from considerations of public policy wholly apart from reasons of sanitation. The whole presumption of the old housing law rested on the idea that the motive of local authorities' action in this regard was the sanitary one. Action was to start with the declaration of an "area," or a certain patch of house property as being insanitary; and then the business of clearing it out and providing sanitary dwellings in its place could go on. And a very costly, tedious, and disappointing business it generally proved to be. Of course, perfervid political philanthropists blamed the law for this vexatious result, which in many cases caused local authorities to leave the whole thing alone. But the true weakness of this line of business was not in the law; it was in the conditions, and usually also in the circumstances. The confessed failure of the old system should act as a warning for the future against the passing of Acts of Parliament for doing things not in harmony with the natural order of such affairs. Take, for example, this fundamental idea of making any possible action under the Public Health Act start with an insanitary patch of dwellings. The first necessity is to prove that this condition exists, and that the owner will not remedy the evil by ordinary means. This is not so easy of proof. Truly incurably insanitary house property is not so common that town clearings of considerable extent can be accomplished on this excuse. Consequently, such clearings have to be effected by the far more costly procedure of buying the property at its normal value, which renders reconstruction impossible save at a sacrifice. There overcrowding is a dreadful evil, calling for a remedy; but it does not condemn the property where it occurs.

The short point of all this is that it is impossible to clear town areas and rebuild them with decent dwellings at rents which the present occupiers can pay, without either violating the rights of property, or laying out public money unremuneratively. This is the dilemma of the old dispensation. Local authorities with the best will in the world could not move in the matter, by reason of this impossible alternative. Naturally, the same consideration formed an impenetrable shield for the apathy of heedless authorities; and so long as the only legal motive for corporate action was the sanitary one, or that of the desirability of making town improvements, there was no way out of the deadlock. Private enterprise, both philanthropic and commercial, could still do something; but it could never be adequate to the public need. The private builder of improved workmen's dwellings has to wait for his opportunity, and build where he can, not where he would. Meanwhile, the state of things described over and over again in parliamentary debates has been going on, and the housing of the poor in busy, wealthy centres of population has grown from bad to worse. Ramshackle tenements, once merely thickly tenanted, have become chronically

overcrowded. They are in many cases not yet indictable as a nuisance; but the sanitary inspector is known to have his eye upon them, and the landlord does nothing but collect his rents. So the sanitary laws help to make slums. Meanwhile, the corner public-house and the small shops are valuable property, which must be reckoned with in the drafting of any scheme for improving the "area." And when the improvement has been completed, where are the old inhabitants of the quarter?

The great value of the new Act, it is to be hoped, will consist in the fact that it sanctions housing action by local authorities on a fresh motive, and permits action of a new kind. There will be no preliminary boggling over the old conditions. Once the local authority of a growing town is satisfied that a need for more working-class dwellings exists, and cannot be met in the private—which is the natural and ordinary—way, it will be able to buy up a suburban estate and build such houses as experience shows to be suitable. This is the measure which has been denounced as "inadequate," in some quarters. The cry was raised again in some newspapers last week; but the force was taken out of it by the circumstance that, during the debate in Committee, several members of "advanced" views objected to the enlargement of the Bill in various "popular" directions. The fact seemed to be recognized in the House, if not outside, that the Bill does really go quite far enough in permitting local authorities to deal in land and houses, free of all the restrictions hitherto regarded as proper for municipal enterprises of the kind; and also that it adequately rounds off the existing mass of statutory law dealing with town sanitation and improvement, by giving the authorities positive facilities for action in one way if action on other and older lines is impracticable. Whether it goes far or not, at least it offers local authorities a positive way of escape from the dilemma of which they have complained, with more or less good faith. If they mean business, they will now be able to do it to any reasonable amount.

The indirect influence of this constructive piece of legislation, however, is likely to be even more useful than its direct operation. By enabling the municipality to break away from the "insanitary area," it will deprive the "slum lord" of the assurance he has hitherto enjoyed—that in the long run the corporation must buy him out. The establishment on suburban estates of working-class colonies will relieve the pressure of population on the intramural tenements, and render these easier to deal with. It is unnecessary to point out how potent an attraction to respectable artizan families will be the outlying settlement, with its ample supplies of gas and water, and its cheap tramway connection with the town. Here will be the home of the prepayment gas-meter; and the municipal baths and washhouse, the crèche, and, it is to be hoped, the municipal public-house, will all be found here. Meanwhile, the more strictly charitable agencies will be left freer to deal with the very poor and destitute class of townspeople—those who pick up a casual living in the streets, in ways best known to themselves, and who have hitherto been driven from pillar to post by the demolition of their "rookeries." These poor people must live, and they cannot go away from the neighbourhoods where alone they can help themselves and one another to solve the great problem. Not for such as these the Boundary Street settlements, with electric light laid on; but their share in what are called town improvements and the clearing out of insanitary areas has always been a pitiable one. It is their poor chattels that are thrown out on the pavement by the ejectment officers; and they are not wanted back again in the new dwellings. Such things must be, of course; but it is none the less hard upon those who have to bear them, for the good of others.

So much for the Bill. Only experience can prove exactly what it can and cannot do, directly and indirectly. But it is an enabling measure; and its utility will be largely what its administrators choose to make it. No Act of Parliament can work itself; but in this case, local authorities, particularly if they will take counsel with large employers of labour, have something to their hands by which the lot of the working classes may possibly be very considerably ameliorated, to the benefit of the community at large.

PERSONAL.

The management of the Witney Gas-Works has been entrusted to Mr. F. W. Selby, of Watlington.

Mr. G. Watson, of West Bromwich, has been appointed Manager of the Hungerford Gas-Works.

The estate of Mr. Joseph Cowen, of Stella Hall, Blaydon-on-Tyne, who died on the 18th of February, as noticed in the "Journal" at the time, is sworn at £491,826 13s. 1d. gross.

Mr. Harold O. Timmins, son of Mr. Joseph Timmins, Gas Engineer to the Wigan Corporation, has been appointed Engineer and Manager of the Tipton Gas-Works, in succession to Mr. Vincent Hughes. The output of the works is 100 millions per annum. Mr. Harold Timmins was educated at the Leigh and Wigan Grammar Schools, and served his articles under his father. On completing his term, he entered upon a three years' probationary course, at the end of which he was unanimously appointed Assistant Gas Engineer. In this capacity he has served for rather more than four years, during which time considerable extensions of the works have been carried out; and, in compliance with the instructions of the Gas and Electric Lighting Committee, a complete scheme of electric lighting was prepared, the drawings, &c., for which were made by him under the supervision of the Engineer.

At a special meeting of the Stafford Town Council on Friday, Mr. Hubert Pooley, of Dunfermline, was chosen, out of eighteen candidates, to fill the position of Gas and Electricity Engineer to the Corporation, in succession to Mr. J. Ferguson Bell. There were four selected candidates, and these were reduced to two, who were requested to have an interview with the Committee. The Council divided on the question, with the result that Mr. Pooley secured the appointment by 19 votes to 5. Mr. Pooley was called into the Council Chamber, and the Mayor (Mr. W. C. T. Mynors) informed him of the result, and expressed a hope that he would retain the position as long as Mr. Bell had done, and gain the same amount of respect from the Council and the town. Mr. Pooley thanked the Council for the honour they had conferred upon him in electing him to the position Mr. Bell had so successfully filled. He said that in the profession Mr. Bell was held in the highest esteem, and it would be his constant aim to emulate the high character which that gentleman had evidently attained in the town, and at all times do his duty to the best of his ability. Mr. Pooley, who is 32 years of age, is the son of Mr. Henry Pooley, J.P., until recently senior partner in the firm of Messrs. Henry Pooley and Son, of London, Liverpool, and Birmingham. He was engaged in the works of the firm for two years, and there obtained considerable general engineering experience. He studied chemistry, civil engineering, and electricity and magnetism at the College University, Liverpool, under (among others) Dr. Oliver Lodge. He served his articles as a Gas Engineer under Mr. T. O. Paterson, at the Birkenhead Corporation Gas-Works, and subsequently was appointed one of that gentleman's assistants. He spent seven years altogether at Birkenhead, and then received the appointment of Manager and Secretary of the Dunfermline Gas Company. On the transfer of the works to the Corporation in 1896, he was continued in his position; and under his supervision new works have been erected. He joined the Gas Institute as an associate member in 1892, and was transferred to the class of members the next year, in which he was admitted to the Institution of Civil Engineers as an associate member.

OBITUARY.

The death is announced, after a long illness, at the age of 59, of Mr. William Myers Quested, late Manager of the Leatherhead and District Water Company's works.

The death has lately been announced, in his 81st year, of Mr. Alfred Vincent Newton, the well-known patent agent. Deceased was for some years Chairman of the Herne Bay Gas Company.

Mr. Samuel Joseph Syms, the Superintendent of the Gillingham works of the Rochester, Chatham, and Strood Gaslight Company, died somewhat suddenly at his residence, on Tuesday last, at the age of 47. Mr. Syms, who had only been ill a few days, succumbed to an attack of meningitis. He was the son of a former Secretary of the Company (the late Mr. William Syms), and had been employed at the Gillingham works for the past 13 years. He leaves a widow and eight children.

The sympathy of many of our readers will probably be aroused by the announcement of the death last Friday of Mr. W. G. Watson, who was well known to members of the gas profession some time ago as the Manchester representative of Messrs. W. & B. Cowan. After passing through various vicissitudes, he obtained, rather more than two years ago, through the influence of the Chairman, Mr. Donald D. Macpherson, of Manchester, an appointment as traveller for the Gandy Belt Company; and this he held at the time of his death. It will doubtless be a source of gratification to his former friends to know that a somewhat chequered life closed in useful work. He is to be buried in Edinburgh to-day.

The Action of Acetylene on Copper.—In a recent number of the "Berichte," Mr. H. Alexander dealt with the above subject. He pointed out that acetylene has no action in the cold on pure precipitated copper; but when the temperature is kept at about 240° to 250° C., the gas is absorbed with the formation of small quantities of a greenish liquid, having the smell of a hydrocarbide, and a solid body of a bright brown colour, similar to cork in appearance, which gradually fills and finally obtrudes from the back end of the tube. No trace of acetylene has been obtained from this substance, which is not soluble in any reagent. When heated in air, it gives off yellowish fumes, smelling of Stockholm tar, and then takes fire and burns with brilliant incandescence. It contains about 2 per cent. of copper, which, however, can be eliminated by means of hydrochloric acid and ferric chloride, without any alteration in the properties of the substance. Further experiments are necessary to determine the constitution of this body. Provisionally, the author recognizes that the copper plays the *rôle* of contact agent, and effects the molecular condensation of the acetylene in the form of this hydrocarbide resembling cork.

COMMUNICATED ARTICLE.

THE PUBLIC AND THE PRICE OF GAS.

By "X."

An interesting subject for discussion might be suggested by the question: Why do the public generally appear to more strongly resent an increase in the price of gas than they do a proportionate, or even greater, increase in the price of any other commodity? For months past the householder who has had occasion to replenish his coal-cellar has had to pay something over 30s. a ton for the same coal that he previously bought at 20s.; but, although paragraphs more or less (as a rule, less) informed have appeared from time to time in the Press commenting on this tremendous rise in coal, there has not really been any expression of indignation thereat. Why, then, does the consequent rise in gas prices cause so much resentment? It is true that the strongest expressions of feeling are to be observed in articles and letters appearing in the local newspapers published on the north side of the River Thames, and that there are special reasons why the action of the Chartered Company in raising their charge to 3s. 5d. per 1000 cubic feet was not likely to be favourably received by their consumers (not the least among such reasons being the characteristically autocratic wording of the notice sent out—wording apparently calculated to cause the maximum amount of irritation). But, special cases apart, is it not the fact that the public have a tendency to look with unusual disfavour upon a rise in the price of gas?

There is, indeed, only one other increase that the ordinary householder more cordially detests than an increase in his gas bill, and that is an increase in his rates; and in that fact no doubt lies some explanation of his special aversion to a larger gas account. For, owing to the form in which the account is rendered, and the manner in which it is collected, very many householders class their gas bill in the same category with their rates, and look upon the whole as some form of imposition which they only put up with because they must. So many people speak as though they were the victims rather than the customers of their gas company—as though, in fact, they got nothing for their money—that it seems clear that this idea (carefully fostered by the so-called comic paper, with its antique gibes at the accuracy of the gas-meter) lies at the root of much of the hostility sometimes displayed towards gas undertakings. When, further, the gas company themselves lend colour to the popular conception, by acting towards their consumers in the manner of a swollen-headed vestry towards the tradespeople serving them, or of a Government Department towards the British taxpayer, who can be in the least surprised if the consumers begin to "say things"?

What, of course, is at present largely troubling the gas consumer is the question of whether the rise in gas is going to be permanent or merely temporary; and this is the point on which every care should be taken by managers to reassure the public. Here, as often before, Mr. Livesey has done the industry much service, not only by the terms in which his Company have announced the successive increases in their charge for gas, but also in frankly and fully explaining the situation to the Press. The very question just referred to, as being the one that is most troubling the gas consumer, was put to Mr. Livesey by a pressman last week—in an interview which was reported in the "Daily News": "But, Mr. Livesey, supposing this high price of coal should prove to be permanent, as some people are inclined to believe it will?" "It will not be permanent," answered Mr. Livesey promptly, with, says the reporter, "an optimism quite cheering after the warnings of the Coal Exchange people." And, surely, it is right and necessary that gas managers should let the public know that they think optimistically about the future, not only because it is bad business to "cry stinking fish," but because there is every good reason to believe that the present state of affairs is only temporary. All may not share Mr. Livesey's belief that coal will be purchasable six months from now at lower prices than those current; but, at any rate, a heavy fall is certain to be marked before contract time next year. Indeed, although Mr. Livesey stands practically alone in the gas world in not buying for more than the first six months of the usual contract year, his view of the situation is evidently shared in other quarters; for, while some of the great Railway Companies have swallowed the pill, and closed their contracts at the higher rates, others—among them, it is said, the Midland Company—are buying from hand to mouth in the market.

The interesting point to be determined when the fall in coal and iron comes is this: Is the present check to trade due solely to the high prices ruling, and will a partial return to old rates again stimulate business and revive the "boom;" or is that mysterious thing the "trade wave" actually receding? The answer to this question is hard to read; but it is of considerable importance to the gas industry.

Dr. Oliver J. Lodge, F.R.S., Professor of Experimental Physics in the University College, Liverpool, has been appointed first Principal of the Birmingham University.

NOTES.

Boilers at the Paris Exhibition.

It is reported in the "Engineer" that there is nothing new in the boiler exhibits at the Paris Exhibition. With few exceptions—the chief of these being the fine exhibit of Lancashire boilers by the Galloways—most of the boilers shown are of the water-tube type. There must be, of course, a reason for this preference of the water-tube type of boiler by most Continental engineers. Our contemporary finds it in the paramount defect of the Lancashire and Cornish boiler—the restricted area available for the fire-grate. So long as the coal available is very good, or the boiler not much pressed, this defect is not much felt. But with the inferior small coal with which Continental engineers have to work, ample grate area is essential. This accommodation can, of course, be easily afforded in the case of the old French "elephant" boiler, and still more easily in the modern water-tube boilers. It does not strike our contemporary that the boilers at the Exhibition are at all hard-pressed; and the fuel in many cases is dust coal mixed with water to the consistence of mortar, and spread to dry on the dead-plate before being pushed back on the fire-bars. Great care is taken to collect dry steam from these boilers, by carrying the steam pipe up vertically, high into the air (over 16 feet) before it is bent over and led into the steam-main. On the whole, although there is no novelty in steam-raising practice on exhibition, the boiler engineering is up to a high standard of design and workmanship, for stationary work.

Spirit Incandescent Lamps.

Mention was made in a recent "Note" of the introduction in Germany of the "spirit incandescent" lamp, in which a Welsbach mantle is heated by an alcohol flame. Further inquiries into the matter have given us the information that there are several makers of lamps upon this principle, which succeeds best in the case of lights of considerable power, such as are used for the lighting of railway stations, yards, &c., where town's gas is not available. These lamps and their lanterns are self-contained, and can be suspended by a chain. They are made to burn for 24 hours with one charge of spirit; and yield the light of 70 candles for a consumption of one-tenth of a litre of denatured potato spirit. Unfortunately, this is not an article of commerce in England. The English Government has been approached many times to permit of the marketing of alcohol denatured with something else than the wood or mineral naphtha which is relied upon to make the "methylated" spirit of the shops. In Germany, the same object is attained by adding pyridine to the spirit, the resultant mixture burning much cleaner than the English methylated spirit, which always leaves a dirty, sticky coating on everything it has touched. For this reason, imported burning spirit is requisite to enable the incandescent spirit light to be used in this country, which limits its use to large consumers. It is reported that the Imperial Palace Gardens of Sans Souci, Potsdam, are lighted with 220 of these out-door spirit incandescent lamps. The system is regarded as constituting a powerful rival of acetylene for isolated lighting in Germany.

The Performance of Incandescent Electric Lamps.

Mr. Francis W. Willcox has expounded to the Franklin Institute the facts of incandescent electric lamp performance on the results of the best American practice. He admits that many of the published returns as to the candle power of lamps for current consumed are misleading. This is because it is not often that manufacturers state the efficiencies at which the test lamps were started, which makes all the difference. The same remark applies to the voltage, as it will not do to compare the performance of 50-volt lamps with those made for 100 volts. He shows a diagram of ten 100-volt 16-candle power lamps falling to between 11 and 12 candle power in less than 400 hours. This amount of falling-off in light seems to be usual with even the best lamps that passed through his hands. He speaks of an example showing how well-made lamps should perform; and not one of them maintained its original rated illuminating power for much more than 100 hours. At 200 hours they were all down to 15 candles, at 300 hours to 14 candles, and below 13 candles before 500 hours. With bad lamps, 12-candle power was reached in 100 hours. It appears that the American rule is to use the lamp to the 80 per cent. limit, which is about 12½-candle power; and this should be reached in little over 500 hours. It is observed that the filament of a lamp ought to show a bright, steely surface, free from black spots; for such filaments will prove both efficient and long lived when properly operated. Mr. Willcox insists on the economy of throwing away old lamps as soon as they have fallen off in their lighting effect by 20 per cent., declaring that the tendency to keep old lamps in use is responsible for most of the dissatisfaction felt by users of the electric light at the present day.

The Lubricating Quality of Oils.

The question of what is the essential quality of lubricating oils has recently been discussed by Professor Joseph Claudy, and in the "Engineer." The former states that the only systematic method in laboratory use for testing lubricating oils is the determination of their viscosity, which is measured by the difference of the times of flow through a small hole of equal quantities of

the oil and of water. Although this method has lent itself to the useful classification of lubricating oils into groups of the same character—as spindle oils, cylinder oils, and so forth—it is far from being a complete indication of comparative lubricating value; and therefore practical machinists have preferred to judge lubricating oils by simply rubbing a drop between the finger and thumb, which enables experienced men to gauge the comparative slipperiness of the samples. Oil dealers call this quality "fattiness," or "oiliness," which is just what is wanted to enable an oil to stick to a rubbing surface and resist being squeezed out from between bearings. Dr. Claudy has endeavoured to regularize a test on the same principle, so as to obtain an arithmetical expression for the measure of this quality in lubricants, which he refers to the viscosity modified by adhesion to surfaces. With this object, he recently constructed an apparatus for measuring the capillary viscosity of samples of oil, consisting of a metallic cylinder and piston expelling the oils at a constant pressure in a layer of known thickness. The results in no way correspond to the measure of viscosity given by the rate of flow through a hole. Dr. Claudy divides one result by the other, and so arrives at what he regards as a reliable figure expressing the adhesion factor of the lubricant. The treatment of the subject by the "Engineer" does not go so far in the direction of a solution of the question of the accurate comparative measurement of the oiliness of a lubricating oil.

Experiments on Heat Radiation.

An interesting little experiment calculated to impress students of physics with several facts concerning heat radiation is described in "Nature" by Professor Fischer, of the Munich High School of Technology. Three similar chemical thermometers are selected, the bulb of one being left unaltered, while one is silvered over, and the third coated with dead-black by dipping it in lamp-black and spirit. These three thermometers indicate the same temperature if there is no source of radiant heat near them. But if a gas-flame is brought within 20 centimetres of the thermometers as they hang side by side on a stand, they begin to indicate very differently. Starting (say) at the figure of 20° C., the blackened bulb shows the effect of the heat quickest, and the mercury rises highest. The plain glass follows next; and the silvered thermometer is least and slowest in changing. The blackened bulb almost completely absorbs the rays falling on it; the silvered and polished bulb reflects the radiation; and the plain glass partly reflects and partly absorbs the rays. Thus, none but the silvered bulb thermometer indicates the temperature of the air communicating heat to it by conduction. As the other thermometers rise in temperature, they emit radiation; and when the amount of this emission balances the received radiation from the gas-flame, they are in the stationary stage, which is, of course, different for the three. When the gas-flame is put out, the mercury falls at different rates. Observations made simultaneously on them at one minute intervals, and plotted on squared paper, illustrate fairly well Kirchhoff's law enunciating that a body emits those rays best which it absorbs best. If a piece of ice is put in place of the gas-burner, the blackened thermometer shows the greatest fall, and the silvered one the least, for the same reasons. If the blackened bulb is wetted, the temperature falls, even although the gas is lighted; but after a few minutes the mercury rises very quickly.

The German Brown Coal Industry.

The dearness and scarcity of good coal lend additional importance to the enterprise that is being shown in Germany in the development of the brown coal or lignite resources of the Rhine Valley. According to a report of the British Vice-Consul at Cologne, this kind of fuel is mined, or quarried, in a large district having its centre at Brühl, half-way between Cologne and Bonn. Owing to the bulky nature of the brown coal, and its lightness, it never became an article of extensive trade until modern methods of treatment were applied to the raw material. The most important of these methods is the manufacture of briquettes by hydraulic pressure, which renders commercially possible the transportation of the coal to a distance. In this form it goes all over Central Europe, to markets where coal is dear. According to a contemporary report by F. Isaac on certain lignite briquettes of German origin which he found offered for sale in Belgium, this fuel is easy to handle, is not dusty, and burns easily and well with a long, bright flame at first, afterwards turning blue. It does not crepitate, and requires only a slight draught. It burns out completely, without cinders, but leaves a heavy red ash. Upon analysis, these briquettes showed 15 per cent. of moisture and 5 per cent. of ash, leaving 80 per cent. of combustible. Allowing for that required to evaporate the moisture, the net heating value of the fuel is 5500 calories, as compared with 7000 calories for Belgian coal with 2 per cent. moisture and 6 per cent. ash. Consequently, the useful ratio of coal to lignite is 1 : 0·8, which very nearly corresponds to the respective market quotations. At any rate, this Rhenish brown coal industry has become a feature in the industrial life of the Rhineland, especially in the growing Cologne district. In addition to the briquettes, shale oil and other products of the same deposits are worked. The deposit is very large; and it is expected that the output of briquettes will shortly exceed a million tons annually. All this will certainly tend to relieve the pressure on the block coal supply.

TECHNICAL RECORD

WESTERN (U.S.A.) GAS ASSOCIATION.

(*Continued from p. 1724 of Vol.* LXXV.)

A paper on the public control of rates was read by Mr. G. M'Lean, of Dubuque, Iowa. The author argued that the right of the State to regulate and control the rates of public service was a principle of the common law—growing out of the policy of that law respecting monopolies—and that it was unjust and inexpedient to oppose the right of public control. He denied that such regulation need rouse the alarm of investors, or restrict an enterprising policy; and he proposed to show that it protected the public, it offered no menace to the legitimate interests of the company, and, indeed, was likely to be advantageous. The whole policy of the law supported the view that the body granting the charter should reserve the right to control the rates; but whether a city could do so without special powers, was a purely legal question. The right to control rates should not be exercised where competition existed, as that of itself was an excellent regulator. The decisions of the highest court as regards the prescribed rates being such as would give a fair profit on the value of the property as a going concern, afforded absolute security to investors. There was no greater risk than that due to incompetent management, which led to public hostility. Public control established a sense of security from extortion; and the company subject to it did not need to go into municipal campaigns to protect its interests, to carry politicians on its pay roll, or to pay a part of its earnings to the public treasury, while its charter was practically safe. And where it was resisted, the public authorities might resort to extremes.

Captain White, being called upon by the President to open the discussion, thought that the author was very optimistic as to the consequences of admitting the absolute right of a State or a city to determine the rates at which gas should be sold. It was all very well to let the State impose taxes; but would the city—possibly with municipal ownership and absorption in view—apply the principle indicated, and value the property as a going concern? In the course of a large experience, he had never known a city legislature to approach the subject of the price of gas, or the value of the gas undertaking, in honesty or decency; and the appeal to the Supreme Court meant an enormous expense and elaborate and tedious legislation, which very few companies could stand. Public opinion was more in favour of forcing the company to sell as low as possible than of dealing fairly with the question; and the opposition to the gas company did not come from the most thoughtful and intelligent men of the district. Could the author of the paper quote a single case of a gas company coming before a State Legislature and getting square, honest treatment? After appearing in courts and commissions all over the country, it seemed to him that the fundamental principle with which this question was approached was not one of fair, honest dealing. A man living close to a bank of the Mississippi River had to watch for the first trickle, so that it might be plugged forthwith; and in conceding the right and justice of the author's theory, they would admit the first small break, and the flood of socialism would eventually destroy their corporate industries. The whole question was whether they were to be mere units with no rights, or at liberty to conduct and control their business in an independent manly way—letting natural competition control the field, and natural business aptitude control their actions. Mr. Pratt believed that the Courts of the States would afford better treatment and prospects of justice than the average city council. The President urged the importance of preventing the ordinary city council from interfering with gas affairs. There was, he said, no chance with them whatever, as they would take all they could get. He agreed with Captain White that this class of interference should be avoided. He knew of cases where the city council were simply trying to destroy the existing gas company. He did not know how they could resist the control of the legislature that granted their charter; but the legislature was better than the council. Mr. Doty said there was a difference between a company and a franchise. The first had certain powers, perhaps a special license from the State; but the second had made a bargain or contract with the city authorities, which both parties were bound to respect. The city could not change the price, or otherwise alter the conditions, during the life of the contract. While he did not object to a license or contract, he was opposed to public control of vested rights as neither fair nor just. No public authority should fix, as long as he could resist it, the price at which he should sell gas. Mr. Egner remarked that agitation sometimes arose from the low price at which gas could be sold in England; and that the difference in the purchasing power of money in different countries was overlooked. Mr. Diall said that selling cheaply was no protection. At Terra Haute his price was 3s. 4d. per 1000 cubic feet; but the City Council had granted a franchise to an opposition company who agreed to sell at 3s. 1½d., less 10 per cent. for cash. Mr. Britton thought the question was to some extent a local one, as different laws prevailed in different States. In California, the "Sand lot Constitution" gave municipalities prior rights both as to gas and water supply. The best way to prevent raids was to get into a position to make the cheapest rates

themselves. This would prevent all fair, honest competition; but could not keep out that other sort. At San Francisco, there was a Board of Supervisors who fixed the price. A man who ever trusted himself before an ordinary board of councilmen or supervisors took his life in his hands. Mr. T. D. Miller complained that the difficulty was that the companies' statement and evidence was not accepted; and he instanced a case in which the opposition actually brought out the profits as more than the total receipts. Mr. Doherty said that this matter was not at all peculiar to one Association or to the gas business, and counselled united action.

Mr. M'Lean, in replying, complained that many of the speakers in the discussion had missed the chief points in his paper, and had brought in extraneous matter. They could not overcome the principle of public control, because they could not alter the constitution of the United States. His critics had suggested no alternative; but he assumed the idea in their minds was a fixed contract for a stipulated period. He contended that this plan was useless in disarming public opposition, and where, after a great deal of trouble and expense, long-term contracts had been closed, the subject was under continual discussion. But where the control of rates was left open to the public authorities, the effect was to soften opposition and propitiate unfriendly sentiment. Then it was assumed that the city councils would fix ruinously low rates. They had no authority to do anything of the kind; and such ordinances could not be made effective. The Courts had repeatedly said that the power to regulate was not the power to destroy. All decisions clearly showed that the councils could be challenged to show that the rates fixed were sufficient to yield a fair dividend on the going value of the concern. Public control was a protection against competition, because when a new company came along with new terms, the old company could say, "If the new terms are compensatory, put them on us. There is no excuse for chartering a new company." His critics had proved nothing in favour of long contracts. One reason that seemed to justify his paper was the enormous cost to gas companies of the fear of legislative control. This fear that hostile authorities could endanger payment of interest or principal prevented gas companies from raising bonds as cheaply as other industries. Yet it was decided twenty years ago, in the "Granger" cases in the State of Iowa, that no public authority could put other than a compensatory rate upon a gas company.

Mr. Steinwedell, of Belleville, Ill., read a paper describing a form for a complete monthly report of the operations in a gas-works. He remarked that in many cases returns were limited to gas made and sold and coal purchased and used; no record being kept of coke, tar, purification, and several other details. He insisted on careful and accurate valuation of all stocks on hand, and described several precautions that must be observed.

The paper gave rise to a conversational discussion. Several members were in favour of a standard form for stating working and financial results, which could be used by authors of papers, &c., and constitute one even basis for calculating and comparing working in different localities. Others pointed out that a form, if prepared and agreed on, would not be strictly followed in every case. The size of the works, and possibly particular local conditions, would have to be considered; and after allowing for that, there would always be individual differences of opinion.

"Candle Power; its Present Relation to the Gas Industry" was the subject of a paper read by Mr. John R. Lynn, of Portsmouth, Ohio. Candle power, as ordinarily expressed and determined, apparently did not possess the importance attached to it in the past. It had never been the rule to take as a basis for calculation the rated consumption of gas by the form of burner generally used, but the argand burner consuming 5 cubic feet of gas per hour at standard temperature and pressure. At no time, however, was the argand largely patronized by the public; and while it may in the past have been a happy medium, owing to the great variety of flat-flame burners in use, it did not at present approach such a relation. Even if the 5-feet "Bray special" was used, the results did not express the value of the tested product, which should receive credit for what it can do and is doing. The bulk of commercial gas lighting was now done by the agency of the incandescent burner, which depended upon heating power, and not on photometrical value. The annual sales for fuel purposes had gradually crept up to a most important proportion of the whole output; and this department had no direct relation to candle power. The same might be said of gas used for motive power. Of 67,000 million cubic feet of artificial gas supplied during the year, he learned that 17,000 million were used for fuel and power, and estimated that 17,000 million were used to produce incandescent light. Thus more than half of the whole was consumed by appliances having for their primary object the generation of heat; and with regard to natural gas, by far the greater proportion was used as a source of heat. Some tests of the heating value of Ohio and Canadian natural gas, taken in 1895, showed an efficiency of 810 and 891 units respectively. The Ohio sample had evidently by some means been diluted with 12 per cent. or so of air, in the absence of which its value would be over 900 units. The natural gas in Pittsburg and Central Ohio was valued in practice at 1000 units; and though its candle power was only about 8, 2⅓ cubic feet per hour in a Welsbach burner would give a better result than 3 feet per hour of the best artificial gas, although the latter showed a photometrical value more than double. As instancing the absurdity of valuing gas by its candle power, he mentioned that natural gas with a flat-flame burner might give a duty of only 1¼ candles, but it would give 30 candles with a Welsbach; and makers of carbide, in comparing the value of acetylene, took the flat-flame result. A fair basis of comparison showed a value for acetylene only twice that of coal gas; and as the cost was three times as much, it was easy to see which was really the cheaper. If the relative heating value of the two gases was compared, it would be found that approximately the proportion was 5 to 3; and therefore no margin remained for economy by adopting the incandescent burner for acetylene. In the application of the term "candle power," other competitors had assumed a license injurious to gas interests, notably with regard to electric arc lamps. Even in comparing different gases, the same obtained. An 18-candle coal gas was practically equal in heating value to a 22-candle water gas. It was, therefore, only reasonable to claim that not only the candle value but the heating value of a gas should be considered in estimating its practical value; and many of the "new" processes would come out badly under such a test. Many gas companies were bound to furnish 22-candle gas; and if allowed to supply gas of similar heating value, they would not be forced to use water gas, and under some circumstances could work to better advantage.

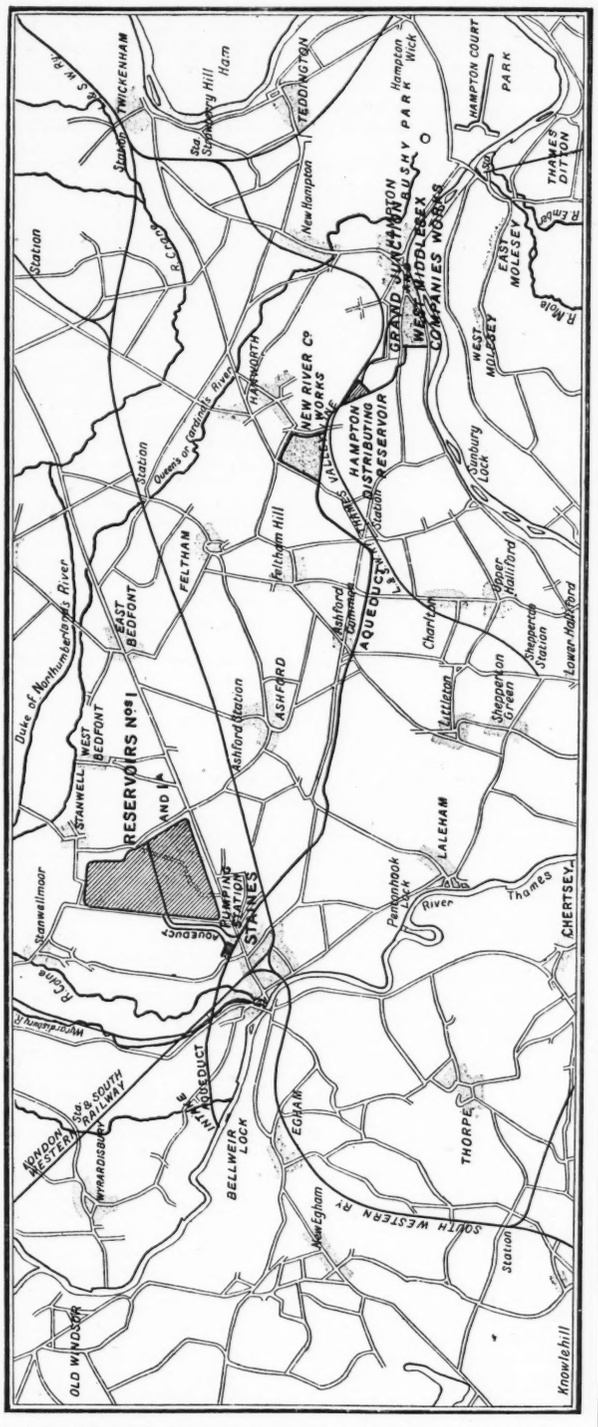
Mr. A. S. Miller opened the discussion, and claimed that no man in the gas business had any reasonable or close idea as to how much gas went for fuel purposes and how much for incandescent lighting. The author stated that a good 18-candle coal gas had a heating value of 787 units; but he questioned whether such gas had ever been found to yield 687 units. He remarked that the temperature of a flame had a marked effect; and it was a fact that 22-candle water gas gave a higher temperature than 18-candle coal gas. He did not accept the statement that the heating values were the same. It might be a good thing to stipulate the heating value of a gas as well as its candle power. Mr. Egner remarked that calorimeters were expensive, and very difficult to get. Mr. Forstall said that the usually accepted data of 48 candle power duty for acetylene gas was much too favourable. Used in one-foot or half-foot burners, it was only about 35 candles. There was some confusion in the paper between heating value and flame temperature, which were not necessarily proportioned to each other. When a gas was burnt, to get any desired temperature all the products of combustion must be heated up to that point. Hydrogen required for its complete combustion 8 parts of oxygen, and therefore 26 8 parts of nitrogen, all of which had to be raised to the flame temperature. Carbonic oxide required only 0·6 part of oxygen and 2 parts of nitrogen. The flame temperature of the two gases was not far apart, although one had fourteen times the heating capacity of the other. Mr. Norris said that Mr. Forstall was dealing with weights, but gas engineers had mostly to do with volumes. A cubic foot of hydrogen had the same heating value as a similar bulk of carbonic oxide; and therefore the author's contention was fairly correct. He agreed that the argand candle power was of no interest to the consumer, and, as compared with flat-flame or incandescent results, it was misleading. The argand was a great leveller of qualities and a helper to lean gas; and a variation of 2 candles on the argand might mean 5 candles on the flat flame. The argand was too favourable to the gas; and the flat flame was the fairer test. The price of carbide was quoted at £12 per ton in cans for export; and he understood its heating value was 1584 units, not 1292 as quoted. Mr. Addicks took exception to the reflections on the argand burner, and claimed that the law provided that the best burner obtainable should be used. The argand was the best for coal gas; but Sugg's No. 6 table-top gave the best results with high-power water gas. He thought the author's valuation of the cost of carbide, and the yield, were too favourable to acetylene. Mr. Somerville said that, according to calculation, coal gas did not contain over about 650 units per cubic foot, and it was impossible to develop something out of it that was not in it. He thought there was a good deal in the idea of valuing coal gas by its heating power, or energy, which had been taken up by the South Metropolitan Company of London.

(To be continued.)

THE STAINES RESERVOIRS SCHEME.

Progress of the Works.

Those of our readers who have followed the Metropolitan Water Question through its various phases during the past few years will recollect the circumstances under which a Committee, composed of representatives of the West Middlesex, Grand Junction, and New River Companies, was constituted by Act of Parliament for the purpose of carrying out a scheme of storage reservoirs in the valley of the Thames, with the object of furnishing to the Metropolis an additional supply of water from that river. The scheme, which owes its inception to Mr. Walter Hunter, M.Inst.C.E., formerly a Director, and now Engineering Director, of the Grand Junction Water Company, was developed by him with the assistance of the late Mr. A. Fraser, M.Inst.C.E., who was at the time the Company's Engineer, and laid by them before Lord Balfour's Commission of 1892-3, who practically recommended that it should be carried out. Subsequently, Mr. Reginald E. Middleton, M.Inst.C.E., who had been engaged as



Assistant-Commissioner, was associated with the above-named gentlemen in the preparation of a definite scheme for submission to Parliament. Shortly afterwards Mr. Fraser died, and the work was left to be carried out by his surviving colleagues. It is unnecessary to trace the progress of the scheme, which was eventually sanctioned by an Act passed in the year 1896. Briefly stated, its object is to draw water from the Thames at a point on the Middlesex side of the river about 300 yards above Bell Weir, pump it into two reservoirs at Staines, and convey it, either from them or from the intake direct, to the works of the three Companies at Hampton.

The Committee having been duly constituted, with Mr. E. Boulnois, M.P., the Chairman of the West Middlesex Water-Works Company, as Chairman, Mr. F. H. Wybroo, Secretary of that Company, as Secretary, and Messrs. Hunter and Middleton as the Joint Engineers, the scheme was fairly launched. The contract was entrusted to Messrs. John Aird and Sons; and a formal commencement was made by the Chairman cutting the first turf on April 30, 1898. The event was duly recorded in the "JOURNAL" at the time, when a full description of the works was given; and since then we have noticed from time to time the progress made. Another opportunity of doing so was afforded on Monday last week, when a visit of inspection was paid to the works by the members of the Joint Committee, accompanied by the Engineers, officials of the three Companies interested, Mr. John Aird, M.P., Mr. Basil P. Ellis, and other representatives of the Contractors, and numerous guests. Notwithstanding the unpropitious weather, a goodly party left Waterloo Station in a special train shortly after ten o'clock, and travelled to Sunbury, where conveyances were in readiness to take them on to Staines. It will be seen from the accompanying plan, which shows the portion of Middlesex embraced in the scheme, that the party were able, from the train, to see the progress which has been made with the distributing reservoir, of about 30 million gallons capacity, at the east of Kempton Park, where excavating, banking, and puddling work is going on. From Sunbury, the line of the smaller aqueduct was followed for some distance, and then it was left, and the drive continued to the intake. Here it was found that great advances had been made. The opening to the river is crossed by a heavy boom, to protect from injury the screens placed there to intercept leaves and other floating matter. The sluice-house, the keepers' cottages, and the gas-producer house are nearly ready; and the large aqueduct to the pumping-station, the first length of which (for about 350 yards) is covered, is practically finished. The water has to be carried by two steel syphons under the Colne Brook, after passing which it flows in an open conduit, the sides and bottom being formed of portland cement made in the proportion of about 5½ to 1. The conduit passes in double tunnel under the two railways shown on the plan, and under the Wyrardisbury River through steel syphons; it then crosses Staines Moor, is syphoned under the Colne, and runs to the pumping-station. The walls of these buildings are up some distance, and the ironwork of the boiler-house roof is being fixed. The pumping plant (which is to be furnished by Messrs. J. Simpson and Co.) will consist of five triple-expansion Worthington engines supplied with steam by six Babcock and Wilcox boilers; and each engine will be equal to the delivery of 16 million gallons of water daily into the reservoirs.

Of the two reservoirs shown on the plan, the smaller one, which will hold 1400 million gallons, is in a very advanced state; while good progress has been made with the larger one, the capacity of which will be 1900 millions—making together 3300 million gallons. They cover an area of 421 acres, or about three-fourths that of the City of London. The embankments vary in height from 21 to 39 feet; the slopes being 3 to 1 inside and 2 to 1 outside. The width at the top is 14 feet; at the bottom, 224 feet. In the centre of each bank is a puddle wall, 6 feet thick at the top, 7 feet at the ground level, and tapering down to 4 feet where it joins the London clay, into which it is securely toothed. This wall, as our readers are aware, has lately been the subject of some criticism in the form of newspaper correspondence. But the Engineers maintain that the wall has nothing to do with the strength of the embankment—its sole function being to prevent the leakage of water; and that, so far as the security of the bank is concerned, it might be replaced by an iron or tin plate. This wall has been raised from 8 feet to 36 feet high for the entire length of the embankment—4¼ miles; the part raised to the full height being 2240 yards, or 1¼ miles. About the latter quantity of the embankment is up as high as it will have to go. The length of the outside slopes soiled is 2240 yards; the length concreted, 836 yards. The concrete lining is 5 inches thick for a vertical depth of 15 feet, so as to resist any wave action which may take place. This portion of the reservoir is therefore almost finished. The length of roadway formed on the top is 363 yards. In connection with the small aqueduct, excavations to the full depth have been made for a length of 4902 yards; the length of invert laid is 4476 yards; the side walls have been built to the full height on either side for 4099 yards; and 7682 yards of coping have been laid on each side wall.

In addition to the work here specified, a good deal of pipe laying, bridge building, and syphoning has been carried out; 376 12-feet lengths of 48-inch pipes, or 1504 yards, having been put down. The tunnels and water towers at the two large reservoirs—massive constructions of portland cement concrete, the former lined and the latter faced with blue bricks—are being pushed on with as much activity as possible. There are six steam navvies getting banking, and one getting clay for puddle, at the Staines reservoirs; two pug-mills grinding clay there, and one at Hampton. On the larger aqueduct there are 415 men at work; on the smaller one, 476 men; and on the two large reservoirs, 1044—making a total of 1935 employed by Messrs. John Aird and Sons. In addition to these, Messrs. T. Piggott and Co., who have the contract for supplying the steel pipes, have 14 men upon the works.

It is hoped that the smaller of the two reservoirs at Staines will be ready to receive water about this time next year, and that the whole scheme will be carried out well within the specified time. Its completion will give London an additional 35 million gallons, or, with the permission of the Local Government Board, in cases of emergency, 45 million gallons, of water daily. The maximum quantity allowed to be taken from the river for purposes of supply and for filling the reservoirs is 100 million gallons per day. But the Committee can only take in at Bell Weir the surplus water above a flow of 265 million gallons daily, which is equivalent to 364 million gallons at Teddington; and, after providing for the statutory 130 millions which the Companies have a right to take between Sunbury and Molesey, 234 millions will be left to flow over Teddington Weir. The reservoirs when full will contain sufficient water for the

supply of London with the extra 35 million gallons a day for three months.

It only remains to say that the fullest information was afforded to the visitors by the Engineers personally or by Mr. M. B. Duff, the Resident Engineer; and that the Contractors' agents (Messrs. Gilbert and James) answered freely any questions relating to their particular work. Before the tour of the reservoirs was made, luncheon was served in a marquee upon the embankment—Mr. Boulnois presiding. The party returned to London shortly after four o'clock.

THE RATING OF WATER UNDERTAKINGS.

We commence to-day the publication of the technical matter which occupied attention at the recent meeting of the British Association of Water-Works Engineers, by giving the paper read by Mr. F. J. Bancroft, B.Sc., Assoc.M.Inst.C.E. (Hull), on "The Rating of Water Undertakings." It was as follows:—

By 43 Eliz., cap. 2, intituled "An Act for the Relief of the Poor," A.D. 1601, and which first created Overseers of the Poor, it was enacted, "They (the overseers of every parish) . . . shall take order from time to time . . . to raise weekly or otherwise . . . by taxation of every inhabitant, parson, vicar, and other, and of every occupier of land, houses, tithes impropriate or propriations of tithes, coal mines, or saleable underwoods in the said parish, in such competent sum and sums of money as they shall think fit, a convenient stock of flax, hemp, wool, thread, iron, and other necessary ware and stuff to set the poor on work, and also competent sums of money for and towards the necessary relief of the lame, impotent, old, blind, and such other among them being poor and not able to work . . ." This Act, so far as its main provisions for the relief of the poor are concerned, is still in force; but it will be noted the method of taxation was left open, and no uniform process defined.

By 6 and 7 Will. IV., cap. 96, intituled "An Act to Regulate Parochial Assessments," A.D. 1836, ". . . no rate for the relief of the poor in England and Wales shall be allowed by any justices, or be of any force, which shall not be made upon an estimate of the net annual value of the several hereditaments rated thereunto—that is to say, of the rent at which the same might reasonably be expected to let from year to year free of all usual tenant's rates and taxes, and tithe commutation rent charge, if any, and deducting therefrom the probable average annual cost of the repairs, insurance, and other expenses, if any, necessary to maintain them in a state to command such rent." Although we find the Act refers to "net annual value," the term in the schedule is the "rateable value;" and we also have the expression "gross estimated rental." We do not, however, obtain a definition of the latter till 25 and 26 Vict., cap. 103, intituled "An Act to Amend the Law relating to Parochial Assessment in England," A.D. 1862, section 15 of which states: "The gross estimated rental . . . shall be the rent at which the hereditament might reasonably be expected to let from year to year, free of all usual tenant's rates and taxes, and tithe commutation rent charge, if any."

These definitions, however, appear to have been ambiguous; and the Poor-Law Commissioners deemed it necessary to give their constructions of "gross rent" and "net rent"—viz., "Gross rent" is the rent which would be paid "to a landlord who himself undertakes to pay all the usual tenant's rates and taxes with which the hereditaments or premises rented by the tenant are chargeable, together with tithe commutation rent charge, the expense of upholding the buildings in tenantable repair, insurance against loss by fire, and any other expenses (if any shall exist) necessary to maintain such hereditament in a state to command such gross rent." "Net rent" is "the amount which is received by, or which remains clear in the hands of a landlord after all such taxes, charges, and expenses as are above enumerated shall have been provided for."

These constructions appear to still have been subject to doubt and misconstruction; and we find another attempt, in the Valuation (Metropolis) Act, 1869, to place the meaning of these fundamental terms beyond dispute. By this Act "gross value" is defined to be "the annual rent which a tenant might reasonably be expected, taking one year with another, to pay for a hereditament if the tenant undertook to pay all usual tenant's rates and taxes and tithe commutation rent charge, if any, and if the landlord undertook to bear the cost of the repairs, insurance, and other expenses, if any, necessary to maintain the hereditament in a state to command that rent." The "rateable value" is defined as "the gross value, after deducting therefrom the probable annual average cost of the repairs, insurance, and other expenses, if any, necessary to maintain the hereditament in a state to command the rent."

These latter definitions are in force at the present day, with the modification that, under the Tithe Act, 1891, the landlord, and not the tenant, is liable for the tithe. The writer has deemed it necessary to set forth the several steps by which these constructions have been reached, as from them it follows that before a property can be rated—

(1) It must be an "hereditament." This has been defined by the Valuation (Metropolis) Act, 1869, as meaning "any lands, tenements, hereditaments, and property which are liable to any rate or tax, in respect of which the valuation list is by this Act made conclusive." No specific mention is made of "water-works," and many like undertakings, as railways, gas-works, &c., no doubt come within the scope of the Rating Acts as being beneficial occupiers of land. Many properties are exempt from rating; but it is needless to say water-works, whether in the occupation of companies or of corporations, are not favoured in this respect.

(2) It must be in the occupation of some person or persons. This occupation must be exclusive (an easement is not rateable). It must be beneficial, not necessarily of pecuniary profit, as the tenant is assumed to be willing to pay a rent for its occupation. This is a most important consideration, as it renders rateable property the occupation of which may, or does, cause pecuniary loss. For example, sewers and sewage works were held in the London County Council sewers case to be rateable, as the occupation was valuable as capable of yielding a rent, and board schools have been held rateable although yielding no pecuniary profit. Applying this to a water-works, we see at once an undertaking, whether in the occupation of a company or a corporation, is rateable even if its operations involve pecuniary loss. Its occupation is necessary for the fulfilment of statutory duties; and the company or corporation could themselves be tenants of works provided by another, and in that case would pay rent.

(3) An estimate must be made of the rateable value. From what appears above, it will be seen that the gross value must of necessity be first determined. To ascertain the latter in the case of such undertakings as water-works, which are in general owned and occupied by the same body, a tenant must be assumed, and a further difficulty presents itself in arriving at what he "might reasonably be expected, taking one year with another, to pay for the hereditament."

The same conditions, it will be seen, have to be considered whether the undertaking is in the hands of a public authority or a company, as the ownership makes no difference in the rateable value. The undertaking may be carried on at a pecuniary loss or it may result in profit.

Where there is a Pecuniary Loss.—This is often the case where the undertaking is in the hands of a public authority, who carry on the works for sanitary reasons regardless of deriving profit, and the deficiency in the revenue is made good by levying a public water-rate. In this case it must be remembered there is a statutory obligation on the local authority (or company) to provide a water supply; and they themselves may be tenants, and must not be omitted as probable tenants. The question at once arises, What rent might a local authority be reasonably expected to pay for the tenancy of such an undertaking? The fact of the works being conducted at a loss shuts out competition, and, obviously, they could only be expected to pay such a sum as would, after deducting landlord's charges, leave the bare percentage on the capital outlay as the state of the money market at the time demanded for such security.

Where a Profit is made.—Where the profit is insufficient to pay the minimum rate of interest on the capital outlay, the value for rating purposes must be determined as in the preceding section. Where the profit is larger, a tenant could no doubt be found willing to pay a higher rent. Before proceeding to the determination of this rent, reference must again be had to the definition of gross value. By it the landlord is assumed to bear the cost of the repairs.

The words of the statute seemingly place the whole of the repairs upon the landlord, and would, therefore, bring the expenditure on current repairs within the items covered by statutable deductions. This appears to be the practice of some valuers, who place all maintenance and repairs charges under statutable deductions, and as they make no allowance for the provision of new plant, would have one imagine that works and mains can be patched up for ever, and that renewal is never required. It is, however, absurd to suppose that for ordinary repairs arising in the working of the undertaking, a tenant would call in the landlord to execute them. If a fire-bar required replacing by a new one, a valve-seat renewing, a plunger repacking, or a burst main repairing, it is only reasonable to suppose the tenant would do the necessary work out of his revenue; and these and similar items should be included in working expenses. For the landlord to do the current repairs would be for him to partly work and control the daily operations, and would confuse the relation of landlord and tenant, which it is the aim of the statute to separate. A time arrives when an engine must be entirely replaced or a main taken up and a new one substituted; this being necessary to maintain the hereditament in a position to command the rent. This is the work which should be taken as devolving on the landlord—viz., the renewal of the structural works when they are no longer capable of performing their functions with ordinary tenant's repairs.

The estimate of the rental value must be made on the conditions obtaining at the time. Present value is the only consideration; and neither correction for past losses nor prophecies concerning the future can be considered.

Remarks.

Receipts.—In these are included meter-rents, although some valuers exclude them. In the case of *Regina v. The Parish of Lee*, meters were found to be mere chattels; consequently the

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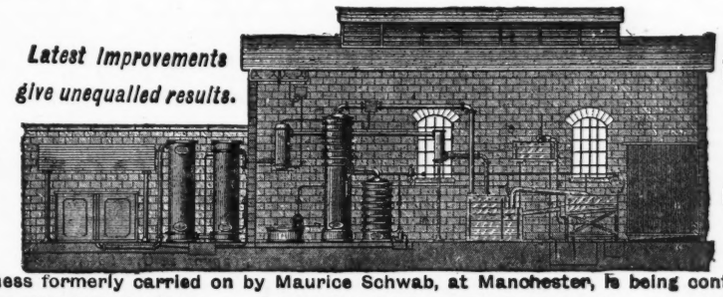

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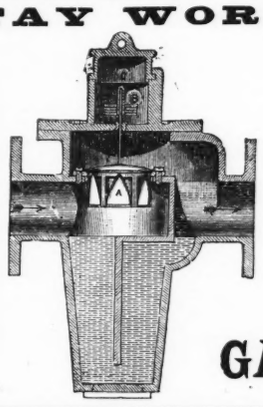

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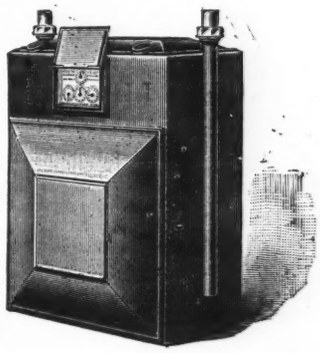

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Gross receipts from water-rates, including meter-rents, and less bad debts, allowances, and empties £24,307

Working Expenses.

Pumping charges, including coal, wages, stores, tenant's repairs, and maintenance	£2,826	
Reservoir and filtration charges, including materials and labour	501	
District charges, including wages of turncocks, labourers, and tenant's repairs, and maintenance of mains	2,365	
Salaries	1,560	
Collection	300	
Printing, stationery, and miscellaneous charges	255	
Law and parliamentary charges	400	
		8,207

Profit (*plus* rates) to be divided between tenant and landlord £16,100

Tenant's Share.

Estimated Working Capital.—Proportion of working expenses—stock, coals, meters, tools, &c.; cash balance at bank (say) £12,000
17½ per cent. on estimated capital £2,100

Balance of profit (subject to deduction for rates) = Owner's share, or gross value *plus* rates £14,000

	Statutable Deductions. Structural Valuation of		*Estimated* Life, Years.	*Sinking Fund for Renewal.* Sinking Fund at 3 p. c. Interest to replace Structure at end of Life.	
Buildings	£20,000	..	40 at ..	1·32 p. c.	£264
Machinery	40,000	..	15 at ..	5·38 p. c.	2,152
Reservoirs	15,000	..	40 at ..	1·32 p. c.	198
Wells	34,000	..	30 at ..	2·10 p. c.	714
Mains	90,000	..	30 at ..	2 10 p. c.	1,890
Chattels	3,000	..	15 at ..	5·38 p. c.	161
	£202,000				
Insurance of buildings, boilers, and machinery					50
					£5,429

Rateable value (*plus* rates) of whole undertaking (£14,000 − £5,429) = £8,571

Assessable value of works and land	£116,000
Assessable value of trunk-mains	28,000
	£144,000
Assessable value of distributing-mains	62,000
	£206,000
Rateable value of works, land, and trunk-mains (£141,000 at 3 per cent.)	£4,320

Division of Rateable Value of Works, Land, and Trunk-Mains between Parishes A, B, *and* C:

Parish.	Description.	Assessable Value.	Rateable Value.	At in the Pound.	Rates.
A	Works, land, and trunk-mains	£92,350 ..	£2,770 ..	5s. 2d. ..	£715
B	Ditto	49,000 ..	1,470 ..	4s. 8d. ..	343
C	Trunk-mains	2,650 ..	80 ..	4s. 2d. ..	17
		£144,000	£4,320		£1,075

Rateable value (*plus* rates) of whole	£8 571
Do. of works, land, and trunk-mains (£4,320 + £1,075) =	5,395
Do. of distributing-mains	£3,176

Division of Rateable Value of Distributing-Mains between Parishes B, C, *and* D.

Gross Receipts.		Receipts in Parish.		Rateable Value *plus* Rates of the whole of Distributing-Mains.	Rateable Value *plus* Rates of Distributing-Mains in Parish.
£24,307		£5,560	B	£3,176.	£726
—		7,107	C	—	928
—		11,640	D	—	1.522
		£24,307			£3,176

Rateable Value of Distributing-Mains in Parishes.

Parish.	Rateable Value *plus* Rates.	Rates in Pound in Parish.	Rates.	Rateable Value.
B	£726	4s. 8d.	£137	£589
C	928	4s. 2d.	160	768
D	1,522	5s. 2d.	312	1,210
	£3,176		£6 9	£2,567

Summary of Valuation.

Rateable value of works, land, and trunk-mains	£4,320
Rateable value of distributing-mains	2,567
Total rateable value	£6,887

This is divided as follows:

Parish.	Description.	Rateable Value.	Total Rateable Value in Parish.
A	Works, land, and trunk-mains	—	£2,770
B	Works, land, and trunk-mains	1,470	—
	Distributing-mains	589	2,059
C	Trunk mains	80	—
	Distributing-mains	768	848
D	Distributing-mains	—	1 210
	Total rateable value		£6,887

Note.—The above example is a purely hypothetical one, and has no real existence; and the figures given must be taken as illustrating principles only.

rents would be omitted. The tenant would, when entering upon his tenancy, have to purchase meters, as they are necessary for the working of the undertaking; and he consequently claims a percentage on this outlay. It would, therefore, appear unreasonable to exclude the rents from the revenue, and at the same time claim a return on the purchase price, and also include the cost of meter repairs in the expenditure.

The receipts on account of fitting work are excluded, as this is a source of income quite apart from the undertaking as a water-works. Consequently the expenditure on account of the same work is omitted from the working expenses. The same applies to any other miscellaneous sources of income which are not strictly derivable from a water-works undertaking *per se*.

Working Expenses.—Any extraordinary expenses should be averaged over a number of years, as the tenant is supposed to "take one year with another." No renewals of works or mains are to be included. These are entirely the concern of the landlord.

Rates.—The amounts at present paid must be omitted. If the existing rateable value is low, the rates paid are insufficient; and as the investigation is to find the correct rateable value, the tenant must have credit for paying the increased sum. On the other hand, if the existing rateable value is high, the rates paid are excessive, and to include them in the expenses would improperly reduce the rateable value. Again, when the undertaking extends over several parishes, the rates in the pound will vary; and until the rateable values are correctly determined in the several parishes, the amounts that are properly payable in each cannot be stated. A correction for rates must, therefore, be left till the last.

Tenant's Share.—The hypothetical tenant will require certain capital to conduct the undertaking; and in the case considered, it is estimated it will be from two to three months before he will receive any income from water-rents. The least that can be allowed him will be (say) three-eights of expenses, including rates. He will also require to take over the stock of coal, meters, tools, &c., necessary to carry on the works. Still keeping in view that the undertaking is let to an imaginary tenant, who it must be presumed will have to pay his rent quarterly, some valuers allow him sufficient money to meet this liability, which will become due before he has received any adequate return for the expenses incurred in furnishing the supply to consumers. They, therefore, add a quarter's rent to the foregoing, and also a reasonable cash balance at the bank. In the case under consideration, it is assumed that the total capital required by the hypothetical tenant to carry on the business is £12,000.

The amount of the capital which it is estimated the tenant will require to conduct the business is a fruitful source of dispute. It is in some respects governed by the facts of the case—*e.g.*, whether the rates are collected quarterly or half-yearly, whether at the end of the term or in advance. The capital should be such as to enable the tenant to conduct his business with advantage, and as large as the landlord might reasonably expect the tenant to possess before undertaking the responsibilities of the management. It is obvious that an impecunious person would not be acceptable as a tenant.

On this capital (£12,000) by almost universal agreement, the tenant is allowed the following charges: 5 per cent. as interest on capital, 10 per cent. as trade profit, and 2½ per cent. for risks and casualties; making a total of 17½ per cent. = £2100. This cannot be said to be too large a return for the tenant out of a gross income of £24,307. Indeed, in the case of an appeal by the Metropolitan Gas Company of Melbourne against the assessment of their undertakings for the year 1897 by Melbourne and Prahran, heard before Judge Hamilton, the latter decided that the tenant should be allowed 6 per cent. for interest on capital, 10 per cent. for trade profits, and 4 per cent. for risks and casualties.

By deducting the tenant's share from the profit, the sum of £14,000 is arrived at as the yearly rental, *plus* rates, the tenant is in a position to pay his landlord for the occupation of the undertaking.

The point has now been reached when it is necessary to make a structural valuation of the several parts usefully constituting the whole undertaking, to enable the proper deductions to be made for the renewal (not working repairs) of the works as required to keep them in a condition to command the rent. The various parts, according to their original design and construction, may be taken on an average to require renewal, or to become obsolete, in the following times: Buildings, 40 years; machinery, 15 years; wells and adits, 30 years; service reservoirs, 40 years; mains, 30 years; and chattels, 15 years.

From this structural value and the estimated life, the amount of the sinking fund can be estimated; and this amount the prudent landlord is assumed to set aside each year, at compound interest, to replace the several parts as they become worn out or obsolete. The insurance charges are those which devolve upon the landlord—such as against fire and explosion, not employer's liability insurance, which would properly be included in the working charges. Sinking fund and insurance amount to £5429, and leave a sum of £8571 as the rateable value *plus* rates.

Having now ascertained the total gross and rateable value, if the undertaking extends over more than one parish, it remains to split the total up into the respective sums the several parishes are entitled to. This must not be accomplished by a division

based either on the extent of the mains (mileage principle) or on the capital expenditure in the parishes, as neither would form the basis of the rent which a tenant would give for the occupation of the works in the various parishes. The division must be on the parochial principle—*i.e.*, on the earning value in the parish. This would be a comparatively easy matter if all the works in all the parishes were directly remunerative. This is rarely the case. An undertaking may be divided into two sections: (1) Indirectly remunerative; (2) directly remunerative. In the first section are included pumping-stations, reservoirs, and trunk-mains, and any other works which, although of themselves bringing in no revenue, are indispensable to the undertaking. The rateable value of such works should be arrived at in the same way as works which are conducted at a loss. A structural valuation must be made, and such a percentage taken thereon as the condition of the money market would warrant for such a security. Obviously, this is the net rent which either a corporation or company would guarantee to an owner if they themselves tenanted such works.

What is a trunk-main? This depends on the size of the undertaking. In one case an 8-inch or 10-inch main might come within the term, while in another no main under 24 inches could be so considered. Generally speaking, any main with no consumer's pipe attached thereto, and mains passing through one parish to convey water to another, and consequently larger in size than would be required for the supply of the former only, may be taken as indirectly productive.

Directly Productive.—This section includes all the service-mains, as it is here the revenue is earned. The rateable value of the directly remunerative portion is the remainder of the total rateable value after the rateable value of the indirectly remunerative portion has been deducted. This remainder is divided *pro ratâ* among the parishes with the gross receipts derived from the respective parishes. This is a most important consideration, as some overseers appear ignorant of the axiom that the whole is equal to the sum of its parts, and proceed to the valuation of the portion in their parish regardless of the claims with the other parishes.

Rates.—The amount of these must be taken at what they will amount to after the valuation has been made in the several parishes; and the mode of arriving at the figures has been given above.

Surplus Works.—When water-works are constructed especially in gravitation supplies, they are mostly designed in excess of the present requirements. This was the condition in the case of *Regina v. South Staffordshire Water-Works Company*. But it was held that as the whole of works were used for the distribution of water, the whole capital expenditure must be taken into account, and not so much as would have been necessary had only a small system been constructed. Apparently opposed to this decision, the case of the *Liverpool Corporation v. The Llanfyllen Assessment Committee* may be cited. Here the judgment of the Montgomeryshire Quarter Sessions in October, 1897, was that—

> The Court were of opinion that the value for rating purposes of the property of the Corporation should be ascertained in the following manner: (1) The structural cost of the dam and reservoirs and other works in the two parishes concerned should be taken, as stated by the Corporation, at £646,932. (2) The cost of the land should be taken also, as stated by the Corporation, at £62,250. (3) The amounts expended by the Corporation on bridges, £8337; roads, £55,939; church, vicarage, and schoo's, £13,952—total, £78,228, should also be added as being, in the opinion of the Court, part of the dam and reservoir; making a total capital cost of £787,410. (4) The amount of capital cost thus ascertained, which is at present effective, is arrived at by taking the proportion which the daily quantity of the compensation water, together with the daily quantity of water at present drawn by the Corporation, bears to the total daily capacity of the reservoir—viz., 26½ : 41 = £508,935. (5) One-third of the cost of the parts within the parish of the Hirnant tunnel and of the easement as stated by the Corporation—viz., £9312—to be added to this; making a total effective capital of £518,247. (6) The Court are of opinion that at the present time the outlay on the site and works would, in consequence of the growth of the population, and consequent greater demand for such sites as this, and of the increased cost of labour and materials required for such works, be greater than the actual cost of the site and works to the Corporation, and in consideration of this they think the gross rateable value of the works may be taken at 3 per cent. on the outlay, rather than 2½ per cent., the rate at which the Corporation may borrow. (7) The Court thinks that the straining tower should be rated separately from the reservoir in the parish in which it is situated.

An appeal to the Divisional Court confirmed the decision of the Quarter Sessions, with the exception that they held that the amount expended upon the roads, bridges, church, &c., ought not to be included in ascertaining the effective capital value of the undertaking, and that the effective capital value of the reservoir and site ought to be taken at 26½ to 52½ of the total capital expenditure. (The reservoir is capable of delivering 52½ million gallons per day, though the catchment area at present connected is only sufficient to provide 41 million gallons; but catchment areas capable of providing the remaining 11½ million gallons will ultimately be connected.)

From this decision, the Assessment Committee appealed. Lord Justice A. L. Smith, in giving the decision of the Court of Appeal, stated—

> He could see nothing wrong in including those items of expenditure for church, vicarage, schools, roads, and bridges. The Corporation could not have got the reservoir as it was without paying the money for building the church, vicarage, and school, and asked why this was not the proper expenditure to take into account in arriving at the rateable value. As to the second point, he could not understand why any divisor was brought in at all. According to the decision in *Regina v. South Staffordshire Water-Works Company*, he did not see why anything should be taken off the cost of the reservoir. But the Assessment Committee were willing to make some deduction. What right had the Divisional Court, as a matter of law, to say that 26½ to 52½ was the right amount, and not 26½ to 41, as allowed by the Quarter Sessions? It was a question of fact for the Quarter Sessions. The appeal must therefore be allowed, with costs in that Court and in the one below. Lord Justices Vaughan Williams and Romer delivered judgment to the same effect.

Reservoirs (*Land Covered with Water*).—Under the Public Health Health Act, 1875, section 211, sub-section (1)(*b*), it is provided that: "The owner of any tithes, or of any tithe commutation rent charge, or the occupier of any land used as arable, meadow, or pasture ground only, or as woodland, market gardens, or nursery grounds, and the occupiers of any land covered with water or used only as a canal or towing path for the same, or as a railway constructed under the powers of any Act of Parliament for public conveyance, shall be assessed in respect of the same in the proportion of one-fourth part of only such net annual value thereof." In this sub-section the Legislature apparently takes into consideration the benefits accruing to the property from the expenditure provided for by the rates.

In the case of *The Southwark and Vauxhall Water Company v. The Hampton Urban District Council*, the Company were rated in respect of a reservoir on the full net annual value. They tendered a sum calculated on one-fourth, contending that the reservoir was "land covered with water." The Justices determined that the reservoir was rightly rated on its full net annual value. This decision was reversed by the Divisional Court. Upon this the District Council appealed; and the arguments were heard in December last. The Court of Appeal dismissed the appeal, holding that reservoirs came within the description "land covered with water."

From this decision the District Council appealed to the House of Lords. The Lord Chancellor, in moving that the appeal be dismissed, said that no argument had been adduced to show that the Legislature used the words "land covered with water" in any other than their natural sense, which has been attributed to them by the Courts for more than thirty years. Words would have to be added so as to make the statute run "land covered by water which is not made so by artificial construction." No such words had been added; and he could not understand the doubts expressed in the Divisional Court. Concurrence was expressed by Lord Macnaghten and Lord Morris.

This is a most important decision, and places a not unimportant part of water-works in a favourable position. It will be seen that, under the sub-section above quoted, railways are charged on one-fourth their value; and the term "railways" has been held to include the line itself, with its embankments, the turntables, and sidings. It cannot be seriously contended that water-pipes, for example, derive the same value as do houses, or more value than do railways from the rates expended. That railways are exempt from three-fourths of the rates is, in the writer's opinion, a sufficient ground for asking that such property as gas and water pipes should be rated upon the same basis. Although this is a suggestion that at present cannot be acted upon, the above case respecting reservoirs is a step to that end, and the whole subject should be kept in mind with a view to obtaining redress when the opportunity arrives.

It will readily be perceived from the foregoing that, although the principles determining the valuation of such property as water-works may now be said to be fixed, they have to be applied entirely to hypothetical conditions in a suppositional case; and the whole valuation resolves itself ultimately into a question of opinion. It is, therefore, a matter of astonishment that more disputes do not arise, and can only be accounted for by attributing it to the desire of the opposing parties for compromise, and the hesitation with which both assessment committees and companies embark on litigation promising such doubtful issues.

With a view to placing the system of rating such undertakings on an intelligible basis, Mr. H. Wilkins, Secretary to the Lambeth Water Company, in April, 1897, made the following proposition: "If the gross profits do not exceed 1 per cent., the gross annual value to be taken at 3 per cent. on the rateable capital only, and for every additional 1 per cent. of gross profits, the gross annual value to be increased by ¼ per cent. on such capital outlay. . . . The scale at variations of 1 per cent. in the profits would work out as follows:—

Gross Profits, not exceeding Per Cent.	Gross Annual Value to be calculated at per cent. on Rateable Capital only.
1	3
2	3¼
3	3½
4	3¾
5	4
6	4¼
7	4½
8	4¾
9	5
10	5¼

"Suppose an undertaking has cost £1,860,000, has a gross revenue of £270,000 a year, and earns a gross profit of £149,000 a year. A gross profit of £149,000 is just over 8 per cent. on a capital outlay of £1,860,000, so the gross annual value would be 5 per cent. on the capital outlay, or £93,000. Allowing a deduction of 15 per cent. (estimated cost of repairs, insurance, &c.), the rateable value would be £79,050." Mr. Wilkins desires the writer to state that the percentages above suggested do not necessarily represent figures that ought to be adopted. They

are simply given to illustrate a method of obtaining an equitable result; and experience may suggest some modification.

Whether such a method would prove satisfactory requires careful consideration; and the writer brings it before your notice so that opinions may be elicited from those who have had experience in the present unsatisfactory methods, which are so prolific in irritation, dissatisfaction, and costly litigation. The present practice may be said to exist, and probably will continue to yield approximately fair results only by the spirit of fairness, candour, and compromise, with which experts and courts appear to treat such valuations as those necessary for the assessment of water-works undertakings.

Discussion.

The PRESIDENT (Mr. C. H. Priestley) referred to the difficulty of thoroughly grasping this question of rating, especially where works were situated in several unions, many parishes, and, as in Cardiff, more than one county. On the last septennial valuation for the Cardiff Union, the Water Committee were fortunate in being able to get a reduction of about £4000 in the net rateable value, which, on a septennial valuation, represented a saving of something like £10,000 to the rates payable by the water-works. This gratifying result was mainly due to one point only, which had been overlooked by the valuer in making his valuation. It was this, that he had not given the undertaking sufficient credit for the large amount of rates it paid in other unions and in another county. The author stated that to be rateable, occupation must be beneficial. He had seen a statement published which appeared to rather contradict this, although personally he was of the same opinion as Mr. Bancroft. He believed the question arose in Sheffield some years ago in the case of a large reservoir that was constructed, but not used for several years. In a case of their own at Cardiff, the Corporation were successful in getting the rating taken off a quarry, for which they paid £50 rent, although not getting any stone therefrom at the present time. The Corporation were held to have no beneficial occupation, although willing to pay the rent for use in the future. He thought the author could hardly quote the case of the Metropolitan Gas Company of Melbourne as applicable to an English undertaking, as money was always worth more in the Colonies than in England. The 17½ per cent. was, he believed, the universal allowance in England. He should like to know where a sinking fund for renewal of plant had been allowed as a statutable deduction. The author stated that some valuers did not allow this; but it would be very interesting to know where it had been allowed, and what was the law upon the matter. The estimated life of reservoirs, mains, wells, and buildings, he considered much too low. He had had trunk-mains recently taken out for connections which had been constantly in use for fifty years; and they were little the worse now than when first laid. These had been in good ground. On the other hand, he had had service-mains which had had to be re-placed, although not in use more than twelve years. They were laid in ground made up partly of scavenging refuse, which attacked and ate away the pipes. Large trunk-mains when laid in good ground were, he thought, likely to last at least twice the time stated by the author. Then, again, as to reservoirs, 40 years seemed to him a very short life, especially if large storage reservoirs were included. He knew of many practically as good as new that had been built more than forty years ago. The definition of a trunk-main given by the author was a very good one, although in country districts it was often necessary to tap the trunk-main itself for the purpose of supplying isolated farm buildings, &c., requiring a supply. The recent decision of the House of Lords in the case of *The Southwark and Vauxhall Company v. The Hampton District Council* was a most important one; but he saw that the District Council were not disposed to let the matter stand, and were agitating for an alteration of the law. He understood the matter was being brought before the District Councils' Association, with a view to taking further action. The suggestion that as railways were exempt from three-fourths of the rates, water-pipes should also be exempt was a reasonable one. The suggestion at the end of the paper of a scale of rating in accordance with the gross profits of an undertaking was also valuable. If some such method could be adopted, it would simplify to a great extent the whole system of water-works rating, and tend in a large measure to place all such undertakings on the same basis.

Mr. W. WATTS (Sheffield) said he was not fully acquainted with the circumstances in connection with the rating of the reservoir in Sheffield to which the President referred; but he believed it applied to the Damflask reservoir. Its construction, from the time of commencing to its completion, occupied something like 25 or 27 years. Structural difficulties were met with. The reservoir was a very large one, and was built by the late Mr. Hawksley. For many years, it simply existed as an embankment, without containing any water; and he assumed, during those years, the rating authorities thought they ought to have some rateable value for the site. Hence the contention to which the President alluded. During the last few years, a wing trench had been put in, at a considerable cost; and the reservoir was now in working order, and had been for some years. As to the figures in the paper, if wells and adits and service reservoirs were properly constructed, he felt sure they would have a longer life than the author had given them. The first of the Oldham reservoirs was constructed about 1836; and the pipes put in at that time (which were not coated by Dr. Angus Smith's solution) were in use to-day, and were apparently in nearly as good condition as when they were laid. There was no doubt that much depended upon the nature of the subsoil in which pipes were placed; but surely no practical and intelligent engineer would be fool enough to put large pipes in ground which he knew, or ought to know, would begin to pit the iron the day after the pipes were laid.

Mr. FREDERICK GRIFFITH (Leicester) agreed that the life given by the author to the various parts of the works seemed too short. In Leicester, they had mains which were still alive, after being at work from thirty to fifty years. The author had exactly, and very fully, described the assessment of water undertakings; but, of course, different valuers had different views and ways of looking at the same object. There was no field where barristers and lawyers had greater "gathering-grounds" than in the assessment of water-works undertakings. It was generally admitted that water should be supplied as cheaply as possible; but when the water authorities proceeded to extend their systems, they met with the greatest opposition from the various local authorities and landowners. Then, when the works were constructed, after the utmost compensation possible had been wrung out of the water authority, the rating authorities endeavoured to get the works assessed at the highest possible point. He hoped the time would come when water undertakings would be looked upon as a necessity for the people, and exempt from rating altogether.

Mr. G. GREENSLADE (South Hants Water Company) remarked that, when anomalies were pointed out to public valuers—such as a 12-inch pumping-main in one parish being rated at £20 a mile, and the same main in another at £40 a mile—their simple reply was that they did not go on that basis at all, but on some other. Sometimes he had been successful in getting an Assessment Committee to compare one parish with another, and so had satisfied them as to the fairness of the Company's contentions. He should very much like to see some special line of rating laid down—either on the mileage, profits, or other definite basis. He had raised the question as to the rating of reservoirs, but was told that, his being a covered reservoir, it did not come under the definition "land covered with water." It was a building or structure, and therefore must be rated in the ordinary way. He should like to know whether Mr. Bancroft considered a covered reservoir was "land covered with water," in the same way that an open reservoir was held to be.

Mr. ARTHUR ANDREW (Oldham), referring to the practice in some towns of rating according to the gross receipts, said that in one town close to Oldham, they charged as much as 28 per cent. on the gross receipts. A portion of the Oldham supply district came within that area; and the Corporation resisted the charge, and got it reduced to about 15 per cent. of the gross receipts. In the rest of their supply district, the charge generally was on the basis of 10 per cent. of the gross receipts. But he did not think there was any fairness in charging at this rate. The rateable value ought to be ascertained in a proper way; but this was the practice in many places—it was easy for computation; and it saved a lot of bother to the rating authorities. As to the life of mains, Mr. Watts was quite right in what he stated, that the oldest main in Oldham (it was laid about 70 years ago) was the best main to-day in the district. It was 18 inches in diameter from the reservoir down to Waterhead; and then it was reduced to 13 inches to the town. On the other hand, the main from another reservoir, constructed in 1850 odd, had to be renewed last year. He believed this was a 14-inch pipe. It passed through the same streets as the other, and practically through the same ground. In this instance, he did not think the life mentioned by Mr. Bancroft was very far out. Forty years might be taken as the fair average life of a main.

Mr. T. MOLYNEUX (Stockport) thought the life given by the author for wells and adits was an argument in favour of gathering-grounds. At Stockport, they were at present thinking of increasing their supply. They had two schemes under consideration—one from wells, and the other from gathering-grounds; but personally he was in favour of the latter. He should like to know the author's experience regarding these wells, as he only put their life at 30 years. As to the life of mains, he fancied Mr. Bancroft had averaged trunk and service mains together. If so, 30 years would be approximately correct. As to making the profits the basis of rating, he wondered how this would work out in the case of an undertaking which was not allowed to make any profits at all.

Mr. C. GILBY mentioned that at Bath they had two covered service reservoirs, one of which was constructed in 1764 and the other in 1767, and they were both in use at the present time. He need scarcely say they were probably in as good condition now as when they were built. Therefore he thought that 40 years was putting the life of a service reservoir rather low. His own works were treated very badly indeed in regard to rating. They paid, and had paid for many years past, 12½ per cent. on their net receipts in rates and taxes; and when he raised the question with his Committee as to the iniquity of this, they said: "Well, don't bother about it; it is only taking money out of one pocket and putting it into another."

Mr. W. INGHAM (Torquay) gave some actual figures as to the rating of an undertaking in the North with a capital of £130,841. It would, he explained, have to be nameless, as the figures arrived at were rather favourable. First, they started with

gross receipts £9011; and the working expenses to earn these gross receipts were £1313. An estimate was made of the rates and taxes, which were included in the rent; and these were taken on an average of 4s. 6d. in the pound, which worked out to £1035. Of course, an estimate of some kind had to be made in dealing with the rates and taxes, because they had to be deducted before making the final apportionments. However, the net receipts left to divide between the tenant and the landlord were £6663. For a works of this class, it was only reasonable a tenant should require about £4000 working capital; and an allowance of 17½ per cent. upon this was £700, which left £5963. General repairs were based on three years' average, and came to £663; and renewals were put down at £700. He was not following in the same sequence as Mr. Bancroft; but he got the same results. These figures made the rateable value of the whole concern £4600. On a capital of £130,841, this gave 3½ per cent., which he thought it would be agreed was a fair return for landlord's capital. Then they came to the troublesome part of the business—that was, the separation of the productive and unproductive works. Out of the capital of £130,841, they found the unproductive works amounted to £88,670; and this, reckoned out at 3½ per cent., gave them £3103—leaving £1497 as the amount to be apportioned for productive works. The capital for productive mains and other works was £42,171. With regard to the apportionment of the £3103 (unproductive works) to the various parishes, it was based simply on the structural value of the works; but in the case of the £1497, the rateable value on the productive works, it was calculated out on the gross receipts in the parishes. As to the life of works, he thought he saw in the figures quoted by Mr. Bancroft something very similar to those the Local Government Board gave when they were lending money. With regard to unproductive mains, in one of the Gaslight and Coke Company's cases, the Judge, in summing up, gave it as his idea that the unproductive mains were the high-pressure ones. This was a very liberal way of looking at the matter, because in some districts the high-pressure mains would be worked at about 60 to 70 lbs. on the square inch; and in others at 150 lbs. The whole law of the matter seemed to be based on hypothesis alone. He thought the figures given by the author were far from being merely a hypothetical case.

Mr. W. Matthews (Southampton) remarked that the President rather differed from Mr. Bancroft in saying there must be, for the purpose of rating works, an absolutely beneficial occupation. The Corporation he represented were in the position a few years ago of having established new works and abandoned old ones. Having ceased to pump at the old station, they immediately applied for a reduction in the rateable value—in fact, they claimed they were no longer entitled to be assessed at all. But they were met with the contention that these works were a stand by, which to some extent was true. Time went on, and it became certain they could not use the place; and they severed the connections between the station and the mains, so that the rating authorities might see that it could not be used. They again asked for a reduction; and the reply was: "You have still got your machinery in the building; and if we do not assess it as a pumping-station, we shall assess it as a store for machinery." Upon this the machinery was pulled out and sold. They again applied, and they were then told that, as long as they had the building as part of their undertaking, they must pay rates upon it. Far from being a beneficial occupation, the place was a positive loss to them; but they had to pay rates all the same. It was now rated as land and buildings. Mr. Priestley had asked a question as to allowances for renewals. He (Mr. Matthews) was glad to say that, within the last few weeks, he had got an allowance for renewals of 2·1 per cent.; and it had made a considerable difference to them. He agreed that it was only reasonable they should be rated at one-fourth upon trunk-mains, in the same way that railways were rated. This was a point that should be strongly urged before the Association of Municipal Corporations. As to the life of works, Mr. Ingham had cut at the verge of the question when he said that in the case of a corporation borrowing money, Parliament or the Local Government Board said they should repay the money by way of a sinking fund over a certain number of years; and therefore they had to set by, in the way of a renewal fund, a certain sum of money. When they went before the Assessment Commissioners, and stated that they put this sum of money away for the purpose of renewing their perishable works, it seemed to him no set of valuers could come in and say that it was not a fair way. Then they had to face the question when it came to a company. If a company were doing as they ought to be doing, they would be setting aside a sum of money every year into a proper renewal fund. Unless they could show, when they came before an Assessment Committee, that they were putting a sum of money by in this way, they did not get anything allowed. He had no sympathy with them; and he did not think they ought to be allowed for perishable works, if they did not set aside a sum for the purpose. It appeared to him the thing was settled in principle in the case of the local bodies by the amount they were compelled to set aside, and in the case of companies by the amount they did set aside. Therefore he did not think the actual life of the plant was a very serious matter from the purely rating point of view. He was afraid he should not have very much faith in going to the Assessment Commissioners for an abatement on a covered reservoir.

Mr. W. Jones (Pontypridd) spoke of the inconsistency of rating authorities, especially when they themselves were adversely affected. For some years, he said, the Company he represented supplied a workhouse through a meter; but in consequence of a recent decision of the High Court, the Clerk of the authority gave him notice that henceforth he would expect to be supplied like any other house within the district, considering he was entitled to the usual rate for domestic supply. This to the Company meant a serious loss; but on looking up the rateable value of the workhouse, they found it was simply a nominal sum. This was pointed out to the Clerk; but he said the question of the rating of the workhouse was a matter for the whole Union, so that it did not much matter whether it was high or low. To them as a Water Company it was very important; and so he told the Clerk that, unless he accepted the Company's terms, they should oppose the rateable value of the premises at the next Quarter Sessions, in order to, if possible, receive a fair return for their service to the authority. The Clerk saw danger at once; and the danger was this—that it would not only apply to the poor rates, but to the other rates as well. When he saw the position the Company were taking up, he assented to the old system for a time; but the present arrangement was that the authority had agreed to pay a certain sum for supplying the workhouse. He hoped the paper would tend to bring about, if possible, a standard of rating for water-works throughout the country—at any rate a little more consistency in the valuations of experts.

Mr. A. Wells (Lewes) stated that his works had been re-assessed this year; and they had succeeded in getting their covered reservoirs assessed at one-fourth. This related to three reservoirs.

Mr. C. Sainty (Windsor) said the paper appealed to him at the present time as their undertaking was in three parishes. One District Council had instructed a professional valuer to re-assess their works; and, consequently, this good gentleman came down and doubled their assessment. He (Mr. Sainty) wrote and asked him upon what he based his great increase; and his reply was: "That is a point I really cannot answer. The question is too straight for me; and it has been decided in the House of Lords that we cannot give you any instructions as to the basis upon which we make our valuation." He valued one of their islands, which was in use—for one thing it helped to guide the water into their stream which assisted them with their water power. To his (Mr. Sainty's) great astonishment, the assessment at this particular point was doubled. He wrote asking the valuer why, and the answer was the one he had referred to.

Mr. John Shaw (Boston) said his experience was that there was nothing more difficult for a water-works engineer to preserve his consistency in than in this question of rating. If he was not present as the Manager of the Boston Water Company, he might venture to put the matter from the other point of view, and show that in most cases the rating was perfectly fair. He had had to do with the rating of three different companies whom he had been with; and, unfortunately, they had had different styles of rating. At some length, he commented on the system of rating in the case of companies; and, proceeding, he said Mr. Bancroft had stated that one Act which defined the amount of the gross value was the Valuation (Metropolis) Act of 1869. His (Mr. Shaw's) impression was that it only applied to the Metropolis; but it might be a guide all over the country. In the county of London, he believed the calculation was somewhere about five-sixths of the net value as the rateable value; whereas going over the border into Essex, he believed the valuation there was somewhere about four-fifths; and in the town in which he lived the Assessment Committee put the valuation of property as three-fourths of the annual value. But the Gas Company, the Water Company, and the Railway Company were assessed up to the full annual value. Assessors were brought in to assess the works of the three Companies; and their terms for making the re-assessment were 1 per cent. on the increased rateable value which they could maintain before a Court. At that time, the total amount of rates and taxes of the Water Company were £125 a year, including income-tax. He had no doubt they were then greatly under-assessed; but the next year the rates and taxes jumped up to above £470. When they had a revenue of £3550, the rates and taxes came to £523, which was rather over 12½ per cent. of the net takings. Mr. Shaw also spoke of his later experiences, and of the divergencies in the systems adopted by the valuers. In the case of local authorities, he thought that it would be fair to allow in their working expenses the amount paid as interest upon the water-works loan.

Mr. H. Ashton Hill (Birmingham) said in connection with the question as to the desirability of some practical steps being taken to bring water-mains into the same category as railway lines, he might mention this little fact: When the Company with which he was associated was first established, the Engineer of the railway was also the Engineer of the Water Company; and he very conveniently ran the two things together. The railway became incorporated in the London and North-Western Company; but to this day they had for a distance of about 20 miles a 24 inch pumping-main, passing from 4 to 5 million gallons of water a day, running along the railway on the top of an embankment. He would not recommend water engineers to copy this example; for about three years ago the main burst, and they had the rather startling spectacle of seeing the railway lines

suspended over a channel in mid air. This showed that the running of a main in this way was not advisable; but as a matter of fact, it was evident that at the time it was considered that the water-main and the railway lines were of a kindred nature. Mr. Matthews had been very strong on the point as to water companies being obliged to form a renewal fund. It was not usually considered to be necessary; and he would submit that a renewal fund was simply a "balancing reservoir." They put into it out of the revenue; and they took out of it for extraordinary extensions—renewals really. That was to say, supposing they spent £1000 on the renewal of the mains in a year. They had to provide for that, and had to take the £1000 from the revenue, and put it into the renewal fund; and then they took it out of the renewal fund, and spent it on the mains. If they took the £1000 straight out of the revenue, and paid direct for the works, it made no difference. If they relied upon the renewal of mains costing on an average £1000 a year, that was all they wanted in the way of renewal fund. The only thing was that sometimes it might cost £5000 in one year; and therefore they required a "reservoir." If a few thousand pounds were carried over, instead of distributing it in dividend, this would answer the purpose Regarding the reference to the rating and supply of workhouses, he would point out that they were not bound by the poor-law assessment. If they did not like it, they could get a valuation made, and the rate fixed before Justices at what it ought to be. On the general question, he said in his previous experience, it was the practice of the assistant overseers not to rate portions of his premises. He used to give them particulars from time to time of the parts that were beneficially occupied. New works, reservoirs, and so on, they did not pretend to rate; but they gave them an idea of the date when they began to benefit from them. He agreed that this question of rating might be reduced to some system, without cutting it too finely.

Mr. MATTHEWS wished to correct an erroneous impression in Mr. Hill's mind as to what he meant by renewals. He should be the last to object in the case of one company who were consistently renewing perishable works out of revenue. What he did object to was where a company consistently did renewals out of fresh capital, and had no renewal fund at all.

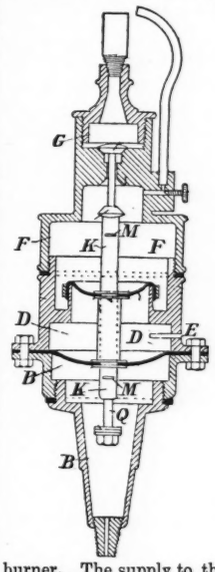
Mr. BANCROFT, in reply, said he had been somewhat criticized as to the life he gave to various works; but he was afraid those members who had claimed such longevity for particular sections of their works would find they had given themselves somewhat away when they went to get their assessments reduced. He adhered strictly to his figures, in which the *useful* life of the works was fairly averaged. One speaker had asked him to give his view as to wells and adits; but every case must be considered solely upon its merits. He knew of one instance in which, owing to the gradual fall of the water-level in a district, adits that were of the utmost value twenty years ago were now perfectly dry. The life of that work, as adits, had ceased; and thirty years would have been too long to allow. The life depended entirely upon the character of the work, and the district in which it was constructed. With reference to a reservoir not being in use, that was a little confusion of terms. It must be beneficially occupied before it could be rated. Whether it was in use or not had nothing to do with the question. It might be simply a stand-by in case of need; and in that case it was certainly beneficially occupied. As to the 17½ per cent. allowed to the tenant as his share, it depended entirely on the money market for one thing whether the risk in that particular district warranted him in getting his 2½ per cent., and whether 5 per cent. was a fair percentage for his capital. Mr. Griffith had suggested that the rating of water-works should be done away with. He (Mr. Bancroft) was afraid that would not come to pass. In cases where the works were entirely in one district, which was supplied and benefited by the works, there would, of course, be no hardship; but in the case of a large extensive works in a district supplying another district, and entirely separate, and subject to different conditions, it would be a considerable hardship in one case, and a financial benefit in the other. Mr. Greenslade had mentioned a comparison of the rating per mile of water-main in different parishes. Comparisons of parishes were no guide whatever. They must go upon the rating in a systematic manner. Whether it came to more or less, there was a proper way to arrive at a particular rate in one parish; but to compare that with any other parish was no argument whatever. It might be too high or too low an assessment; but it was no use going before an Assessment Committee or other authority with simply a comparison of other parishes. As to covered reservoirs, whether they were entitled to be rated at one-fourth of their value was a matter upon which he preferred not to give an opinion. Mr. Andrew had mentioned rating on gross receipts. In taking similar undertakings, it might be possible to arrive at a percentage—15, 12½, or 10, whatever it might be—of the gross receipts that would be a fair amount for the net rateable value. But such a figure could not possibly be applied to all water undertakings. Circumstances would vary; and they must be treated in a systematic method, and no rule-of-thumb could possibly avail in all cases. As to the rating of corporation works, and the payment of rates being simply a question of taking money out of one pocket and putting it into another, he said that whether the works were gas, water, or electricity, they could not afford to have them subjected to the bolstering up of other undertakings. Let every undertaking, he said, whether it was conducted at a profit or at a loss, stand entirely on its own merits, so that every one could see how it was conducted. Mr. Shaw had stated that the rateable value depended upon which side they were on. As scientific men they ought to object very strongly to that view; and they ought to take the view put forward by Mr. Hill—that they should not strain too finely for advantage. As to Mr. Matthews's remarks about abandoned works, he (Mr. Bancroft) undoubtedly thought that works that had become obsolete and abandoned, should not be rated as water-works. Whether a corporation or company put on one side a renewal fund, as a matter of fact had nothing whatever to do with arriving at the rateable value. Under the definitions of the Acts, the landlord was entitled to be allowed, whether he did it or not, so much per cent. to renew perishable parts of his works to the end of their life; and therefore it was not a question they could go into as to whether or not it was actually done in practice.

A cordial vote of thanks was passed to Mr. Bancroft for his very useful contribution.

REGISTER OF PATENTS.

Governor and Self-Igniting Gas-Burner.—Hardy, J. T., of Norton Woodseats, Derbyshire. No. 9390; May 4, 1899.

This apparatus consists of a metallic casing, divided into several compartments. Immediately above the supply-chamber B is an "atmospheric chamber" D, open to the air through a slit or inlet E in the casing. The chamber F above is a "regulating chamber." The fourth and last chamber G is the "burner-chamber."



The chamber B is separated from D by a flexible oil-dressed leather diaphragm; and the chamber D is also separated from F by a similar diaphragm, which, however, contains only half the area of the first. The chamber F is separated from the burner-chamber by a division, in which is provided a central passage with a double-faced valve-seat. Passing through the diaphragms, is a hollow metallic tube K, closed at both ends, but apertures M are provided through which the gas can pass from the chamber B into the chamber F. At the top end of the tube is provided a stalk carrying two conical valves, the apexes of the cones facing each other. The lower end of the tube is furnished with a stalk G, on to which may be secured a number of discs or weights. Alongside the burner is placed a pilot-jet, attached to an ignition-tube, which passes into the chamber F.

Having adjusted the weights on the spindle Q to the night pressure in vogue, it will be found that during the day time, when under low pressure, the weights cause the tube K to fall until the upper valve closes upon its seat, and cuts off the supply of gas to the burner. The supply to the pilot-jet, however, is provided for from the chamber F, which is always in communication with the supply-chamber B, through the tube, so that during the day the pilot-jet only remains lighted. When the night pressure is turned on, the lower diaphragm is forced upwards; and being of so much larger area than the upper one, the tube K, with its valves, is raised. As soon as the upper valve is opened, the gas from the regulating chamber F passes to the burner, and is ignited by the pilot-jet. The lower valve is so placed on the stalk that under normal pressure it does not reduce the opening between the chambers F and G; but if the pressure became abnormal, then it would reduce the opening in proportion to the pressure, and so regulate the supply of gas to the burner. But at no time would it entirely close the orifice; this only being effected by the top valve when under day pressure.

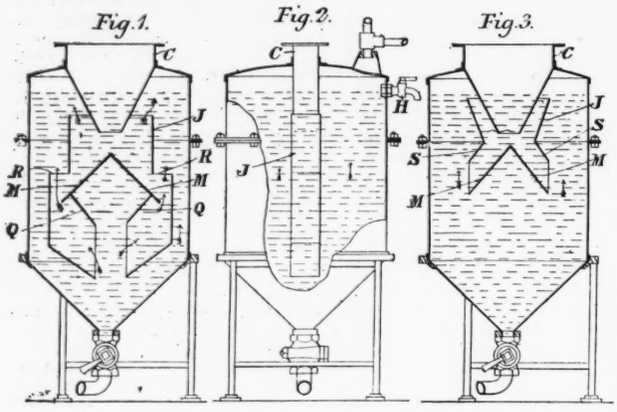
Incandescing Media for Lighting Purposes.—Langhans, R., of Berlin. No. 12,950; June 21, 1899.

This invention relates to "the manufacture of mineral structures for use with incandescent burners, as the incandescent bodies thereof or as the skeletons or foundations of such bodies," by impregnating a combustible fibrous structure with a solution of mineral salts, drying the impregnated fibrous structure, burning the fibre, and exposing the mineral structure left behind to the action of an intensely hot flame in the usual well-known manner. The improvements consist in impregnating the fibrous structure with a fluid prepared from compounds reducible to oxides by the action of heat—such as nitrates of thorium, an alkaline metal, and zirconium, together with silicic acid, and a cerium compound, such as cerium nitrate—in such quantitative relation that the elements silicon and zirconium are present each in the proportion of one molecular weight (slightly more or less), and the element thorium in the proportion of at least eight molecular weights for the incandescent body, and of at least four molecular weights for the skeleton; the proportion of cerium being such that the amount of ceria present in the mineral structure left behind on burning the fibre will not be materially greater than 1 per cent. of the thoria then present. A modification of this manufacture consists in adding to the fluid named "a compound reducible to oxide by the action of heat, of an alkaline earth metal of the type RO or of thallium, particularly compounds of beryllium;" the proportion of alkaline earth metal or thallium introduced being "not materially greater than two molecular weights."

Acetylene Generators.—Husson, A., of Parrentury, Switzerland, No. 13,145; June 24, 1899.

This invention relates to acetylene generators of the type in which the carbide is allowed to fall into a vessel containing water. The objects

aimed at are: To dispense with all mechanism for feeding the carbide into the generator; to dispense with the perforated discs or trays generally used to receive the carbide; to prevent the gas generated escaping through the charging-orifice by means of the water contained in the generator; and to shape the bottom of the generator and the charging-hopper in such a manner that the waste material and water are easily removed from the generator.



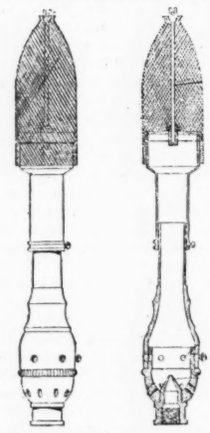
Figs. 1 and 2 are sections of the generator at right angles to each other. Fig. 3 is a section of a similar generator, but having the bottom of the casing inclined in the opposite direction.

The generator has a domed cover and a conical or tapered bottom, fitted with a cock, to enable the waste water and other material to be run off or blown out when necessary. The internal casing J is narrower at the top than at the bottom; the sides of the casing extending from a little above the bottom of the hopper C to within a short distance of the bottom of the main vessel—the casing being open, not only at the top, but also about half way up the ends. In some instances, instead of the bottom of the casing J being approximately parallel to the bottom of the main vessel, it may be inclined in the opposite direction (as shown by fig. 3); and instead of having one central opening in the bottom, orifices may be formed at the sides. The bottom then forms inclined planes M, which may, if desired, have other inclined planes or baffles S parallel to them, so as to form shoots having their mouths vertical, or slightly inclined towards the hopper C.

The action of the apparatus is as follows: The main vessel is filled with water to the level of the cock H. The carbide is charged into the hopper C, and falls through the water on to the inclined planes M, and thence to the inclined bottom of the vessel. The gas generated escapes mainly past the outside of the casing J to the surface of the water in the main vessel, and collects under the cover, whence it is drawn off. The gas which ascends into the casing is deflected outwards by the baffle-plates Q, and escapes through the orifices R and top of the casing; the gas always tending to take the shortest path to the surface of the water. If the shoots shown in fig. 3 are used, instead of the baffles Q, any gas striking the bottom of the shoots is deflected upwards, and no gas enters the shoots, as the mouths are vertical or only slightly inclined inwards at the top, and the gas thus rises vertically to the surface of the water.

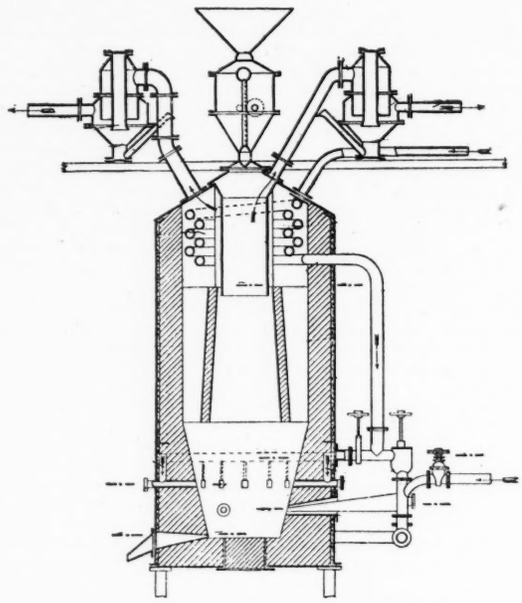
Incandescent Gas-Burners.—Tatham, J. E., of Brixton, S.W., and Cope, J. L., of Drury Lane, W.C. No. 14,023; July 7, 1899.

It is the object of this invention to provide means whereby with a minimum consumption of gas, and at pressure varying from 5-10ths to 10-10ths, a flame of such a temperature is produced as to give a proper lighting effect, with any ordinary type of incandescent mantle. The gas-inlet (as shown) terminates in a nozzle situated in a mixing chamber, into which air-ports open. In this chamber, the air and gas become mixed and pass upwards through pipes to the gauze at the top, where the mixture is ignited. The air-ports are made so as to have an upward direction; the angle of the ports being about the same as the angle of the exterior of the gas-nozzle. About an angle of 30° to the axis of the burner is said to give the best results, and the distance of the opening of the gas-nozzle above the upper side of the air-ports should be about ¼ inch. The tubes above the mixing-chamber are arranged so as to be raised and lowered on one another, and be fixed in position by a set-screw. The height of the gas-nozzle can also be regulated by screwing it out from, or into, the mixing-chamber, and fixing it in position by a set-screw. "Hit-and-miss" air-openings are also employed, which can be regulated by rotating the upper part of the mixing-chamber upon the lower part—a set-screw fixing the parts in their adjusted position.



Manufacture of Water Gas.—Imray, O.; a communication from the Gesellschaft für Lindes Eismaschinen, of Wiesbaden, Germany. No. 14,239; July 10, 1899.

In the manufacture of gas by distilling it from mineral coal (the patentees point out), the production of coke necessitates repeated interruptions of the working for charging and discharging the retorts, and the extraction of the bye-products requires special devices; while in the direct production of gas without the distillation of carboniferous substances, the gases are obtained mostly from the non-volatile constituents, if by incomplete combustion of the materials, or with addition of steam for the production of water gas. In the latter cases, the large proportion of nitrogen in the air introduced for combustion constitutes a very great quantity of useless incombustible gas, which either reduces the calorific power of the useful gas or, as in certain processes, has to be separated. This involves great difficulty in the working—reducing the production of valuable products and of bye-products. To obviate these difficulties, Herr Andreae, of Vienna, has proposed improvements in the production of gas "which, however, have not given satisfactory results." According to his proposals, first, the heat for manufacturing gas is produced by using atmospheric air very rich in oxygen; and the heated coke decomposes the steam afterwards introduced. This necessitates, as in most apparatus for producing water gas, a regular change of the working, so that at least two separate plants having vertical retorts must be coupled together. Each single apparatus of the Andreae type, however, continuously produces gas; but during the alternating periods of hot and cold blowing, gases of very low value are obtained during the one period, and it is only in the other period that water gas of high value is secured.



The present invention has for its object a simplified process and apparatus for the continuous manufacture of "highly valuable water gas;" single shaft-furnaces being employed. By this process, there is a continual production of gases and a complete gasification, without distillation, of the carbonaceous substances; "all the volatile bye-products being utilized, and the production of useless gases being greatly reduced." These results are obtained by employing atmospheric air freed from most of its nitrogen, and at the same time introduing superheated steam into the zone of gasification. The two periods of the hot and cold blowing in the process of Andreae, the effects of which are so sharply distinguishable from each other, are said to be avoided in this process, which is continuous; and the temperature of the combustion produced by the blast rich in oxygen is so high that the immediate admixture of steam to take up heat is necessary. But the temperature is nevertheless so high that it allows of other special admissions of steam into the boshes situated above the hearth; and thus the durability of the structure of the gasification chamber is considerably increased.

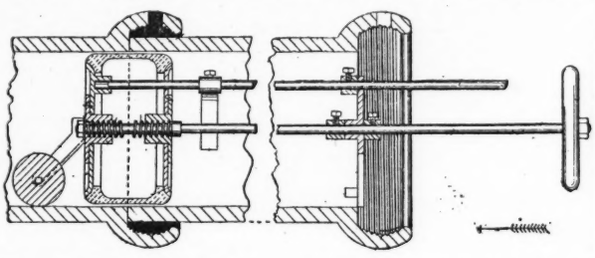
In this process, where air rich in oxygen is used, illuminating gas is produced in the retort; but, in contradistinction to the Andreae process, a gas consisting of carbonic oxide and hydrogen, and a little nitrogen, is regularly produced in the gasifying chamber. A generator similar to a cupola or shaft-furnace (as illustrated) is employed in carrying out the process. The generator is supported by an iron ring, and is enclosed in a gas-tight casing of sheet-metal, closed at the top by an annular sheet-metal lid, capable of expanding when heated. The casing is lined with refractory material, as shown. The furnace contains a retort widened at the bottom, and around which flow the gases ascending from the boshes and hearth into circularly arranged vertical flues, and into an annular space above; the gases being taken off from the charge in the usual way. The lower part of the wall of the retort is made of refractory material, and likewise the part which carries it and forms the flues.

Jointing and Stopping of Pipes or Mains.—Morley, W., of Keighley, and Barker, P. W., of Bradford. No. 15,388; July 27, 1899.

This invention relates to apparatus for forming the joints of pipes or mains, "whereby such joints are rendered more thoroughly water-tight and more free from undesirable cavities and obstructions, which afford lodgment for objectionable matter, than they have been as heretofore formed or produced; while the line or series of pipes are at all times brought into perfect concentricity with each other, with the resultant advantages well understood."

In carrying the invention into effect, the patentees make use of an annular piece of india-rubber, leather, or other flexible material (as shown), of a size somewhat approximating that of the internal diameter of the pipes to be joined. This annular pipe is secured between two discs mounted upon a screwed shaft (the screws of which preferably lead in opposite directions—that is, one screw is right hand and the other left hand), so that as the shaft is rotated, the discs approach each other, and force the annular rubber radially to assume a larger diameter and press upon the inner walls of the pipes, where the jointing of one pipe to the other is being effected. Then plastic semi-liquid binding substance (coal-tar and sulphur boiled together, with any other material—as sand, saw

dust, cork dust, or the like, for thickening or bringing same into a less fluid state) is poured into the annular cavity formed by the spigot and socket ends of the pipes; its passage through the joining to the interior of the pipe being stopped by the flexible annular piece, although the piece will



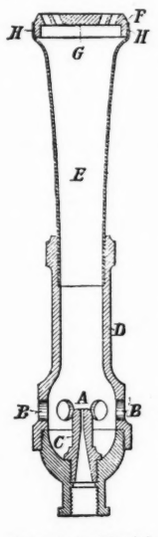
allow it to flow and fill any irregular internal openings that are not covered by it. After the binding substance is run into position, the screwed bar is rotated to cause the discs to move apart, and so free the annular piece as to enable its easy withdrawal.

To secure concentricity of the screwed shaft and the pipes, a guide-roller is mounted on the shaft, on the discs, for contact with the inner walls of the pipes, so as to hold the screwed shaft in position while it is being rotated. A handle is secured to the shaft, as is also a gauge-piece (which likewise acts as a bearing) to enable the rotating of the screwed shaft and its mounting in proper position for the annular piece to be brought into proximity with the joint and so form same as desired.

Incandescent Gas Lighting Burner.—Sugg, W. T., of Westminster. No. 15,521; July 28, 1899.

This invention relates to a burner for incandescent gas lighting, consisting of a circular chamber having holes in its walls, and a tubular extension surmounted by a trumpet-mouthed tube, in combination with a gas-nozzle of coned section internally, leading up to a long outlet-passage with parallel walls, and a disc-burner held in the enlarged mouth of a burner-tube by spring tongues—the disc having a central solid portion surrounded by holes, the axes of which are at an angle from the vertical. It is one of the elements of the combination that was described in patent No. 23,398 of 1899—see "JOURNAL" for May 29, p. 1441.

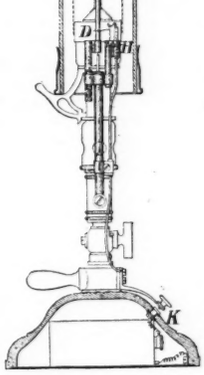
Explaining his proposal, the patentee remarks in his specification: "In incandescent gas lighting, it is well known that an atmospheric burner is required to produce a flame of the necessary quality to cause the incandescence of the mantle. It has hitherto been thought that, in order to obtain the best results, a thorough and complete mixture of the gas and air must be effected before they reach the burner; and so all improvements made in these burners have been with a view to ensure this complete mixture, either by causing eddies in the mixing chamber or otherwise. By a series of experiments, I have found that, however successful the mixing may be, the illuminating power of the light is only slightly, if at all, increased; and therefore I have come to the conclusion that, if any increase in the illuminating power is to be obtained in incandescent lighting, it must be looked for in quite another direction. According to my view, the brilliancy of the light does not depend on the thorough mixture of the air and gas, as hitherto suggested, but on their admission to the mantle at a high velocity, and in proper proportions to produce, under the influence of the heat evolved, an illuminant of great illuminating power. It must not be assumed, from the above remark, that I do not mix the air and gas, as such is not the case—a heating flame must necessarily consist of air and gas mixed in proper proportions; but what I wish to convey is that I make no special arrangement for producing the mixture before it is actually required. On the contrary, I delay the mixing until the last moment, as will be presently more fully explained. Now, in the burners as hitherto constructed, no attempt seems to have been made to ensure that the current of gas issuing from the injector shall reach the point of ignition accompanied by a proper volume of air, without its speed being unduly retarded. On the contrary, everything appears to have been done to retard the velocity of the gas and air, in order to effect the so-called mixture; and thus the brilliancy of the light suffers considerably in consequence. In carrying out my invention, I employ a gas-injector of steatite; but I make the gas-passage of considerable length comparatively, and quite smooth, and thus I prevent the usual hissing noise, and give a true direction to the jet of gas. The gas should be under pressure, to get any result at all in incandescent gas lighting; and I have found that a pressure of from 9 to 10 inches gives the most satisfactory results. The speed at which the gas is flowing will draw in the requisite quantity of air, and will, at the same time, give to the air an equivalent speed. The burner consists of a length of tube, at one end of which is the gas-nozzle or injector, and at the other end a piece of reticulated or perforated material, which constitutes the burner proper. This material is preferably steatite, in the form of a flat disc, having a ring or rings of holes, according to the size of the burner—the holes being bored at a slight angle, so as to give an outward direction to the gas and air issuing therefrom. The centre of the disc is solid; and the stream of gas issuing from the injector will impinge upon it, and will be made to spread. The velocity of the gas will thus be arrested; but as, in spreading, it comes into contact with the currents of air which are passing out through the holes, the velocity of which has been given them by the flow of the gas, the velocity of the gas will be restored. Thus, a mixture of the air and gas is effected at the point of ignition, and this mixture becomes an illuminant of extremely high illuminating power—possessing great affinity for the oxygen of the air, and giving an intensely brilliant light. The gas has, by these means, a free flow direct to the point of ignition, irrespective of the currents of air; it draws in the proper quantity of air; a mixing, so called, takes place, practically at the point of ignition; and the velocity of both air and gas are maintained, so that they are admitted to the mantle at a high velocity. The highest illuminating power coincides with great velocity of gas and air at an inappreciable pressure at the point of ignition."



The action of the burner shown is as follows: The gas issuing from the nozzle C forms a column of gas, which, having a clear and uninterrupted flow, strikes against the solid part G of the burner proper F. As the gas rises (and according to its velocity) it draws in, through the holes B, the air, which forms a tube or sleeve of air round the column of gas, but does not mix therewith. The air thus attains a velocity equal, or nearly equal, to that of the gas. When the gas strikes the solid part G of the burner F, its velocity is arrested, and it is caused to spread. It is thus thrown outward into contact with the upwardly rushing current of air, and is carried with it through the holes in the burner. The gas and air, which have become heated by contact with the burner, thus practically mix at the point of ignition, and the flame, by reason of the inclined axes of the holes, is thrown outwards on to the mantle.

Means for Lighting Gas.—Borchardt, H., of Berlin. No. 7015; April 14, 1900.

This invention relates to means for lighting gas by electricity, wherein the main flame is ignited by an auxiliary flame which, after effecting the ignition of the main flame, becomes extinguished. The gas to form the auxiliary flame is ignited by means of a thin platinum wire on one side of the burner, outside the area affected by the heat of the main flame, and adapted to be heated to incandescence by the combined action of an electric current and gas. But, after the main jet has been ignited, the platinum wire does not continue in the incandescent state, as the auxiliary flame goes out the instant the main jet is ignited—the gas supply to the igniting burner being cut off.



There is an expansible body A arranged within a porcelain carrier or sleeve, through which the gas-valve within the burner-body is operated the moment it comes under the control of the auxiliary or igniting flame. Over the burner H of the latter is arranged a thin platinum wire D, in such a position that it is outside the heat-area of the main flame, on one side of the burner. The platinum wire is electrically connected with a cell or battery within the base of the lamp, while its lower end is electrically connected with the igniting burner. The battery is electrically connected with the body of the lamp, and also consequently with the igniting burner; while at the same time a contact K is placed (say) on the lamp-base, as shown. Upon the gas supply being turned on, the circuit is closed by means of this contact, whereby the platinum wire is subjected to the simultaneous influence of the gas escaping from the igniting jet and the weak current supplied from the battery, under the action of which it becomes incandescent and ignites the auxiliary jet. But the moment the gas-valve in the burner opens, the supply of gas to the auxiliary jet is cut off; so that the auxiliary flame is extinguished the instant the main flame is ignited. The result is that, after the main flame has been ignited, the platinum wire ceases to be incandescent, even should the electrical contact be maintained "inasmuch as without the co-operation of the gas, the electrical current of reduced power is incapable of maintaining the wire in the state of incandescence."

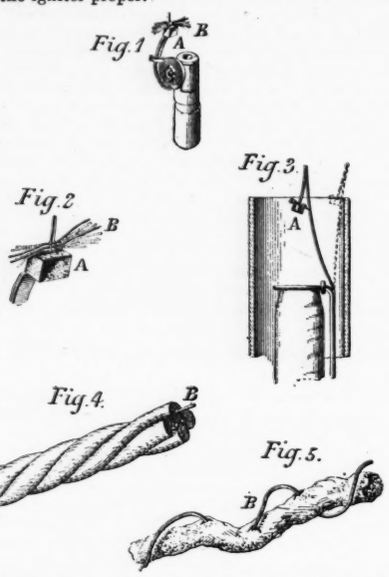
Self-Lighting Gas-Burners.—Thompson, W. P.; a communication from A. Simonine, of Brooklyn, U.S.A. No. 7595; April 24, 1900.

The present invention comprises "the combination of a preliminary heater, the essential part of which consists of platinum black, capable of absorbing and condensing gases or vapours, and thereby cause to glow a second or intermediate heater consisting of metallic platinum sponge or very porous metallic platinum or other metal of the platinum group which absorbs a certain degree of heat from the preliminary heater, and in doing so becomes active, igniting the gas under certain circumstances, or heating up under other circumstances a third member or igniter, which in and of itself is incapable of becoming active, but which when heated by the intermediate heater, will become active and highly incandescent, finally igniting the gas."

Fig. 1 (next page) is a view of an open burner showing the invention applied. Fig. 2 is an enlarged view of the igniter proper. Fig. 3 is a view showing the invention adapted to ignite the gas in an incandescent mantle. Fig. 4 is an enlarged detail view of one of the strands or threads before it is burned. Fig. 5 is a similar view of the strand after it has been burned.

The preliminary heater A is composed largely of platinum black. The secondary or intermediate heater may be prepared in the following manner: A cotton thread which has a very fine platinum wire embodied in it (as B, fig. 4) is impregnated with a solution of platinum chloride. After drying, the cotton is burned out, and the wire is left coated with a covering of porous platinum. If a strong solution is used, then it often occurs that the platinum wire is surrounded by, or forms a support for, a mass of spongy platinum, as in fig. 5, which shows the incinerated thread. The degree of covering of porous platinum formed upon the wire, and the amount of spongy platinum which is left after the thread has been incinerated, are dependent upon the concentration of the solution used; and, in like manner, and to a like degree and extent, the ultimate capabilities of the thread or wire thus formed are affected. For instance (says the patentee), if the solution be not too concentrated, and the porous covering is consequently thin, the thread will act as an igniter direct; but should the solution be quite concentrated, then the coating is thick and heavy, and the thread is incapable of the action which will bring

about an ignition of the gas. In other words, it will not become heated to a sufficient degree to ignite the gas, and can then act only as an intermediate heater to take up the glow from the pill of platinum black and transfer it to the igniter proper.



The construction shown in figs. 1 and 2 embodies the thermostatic device for carrying the lighter out of the path of the flame after the gas has been ignited; but the lighter is, of course, returned to the position where it will be in the path of the issuing gas, after the flame is extinguished and the thermostatic device becomes cool. This, however, forms no part of the present invention, and is simply shown for the purpose of illustrating the working of the device.

APPLICATIONS FOR LETTERS PATENT.

11,031.—Nicholas, J., "Producing oil and gas." June 18.
11,038.—Körting, E., "Internal combustion engines." June 18.
11,057-60.—Beaumont, F. J., "Atmospheric gas-burners." June 18.
11,124.—Wigley, P., and Arculus, E. A., "Incandescent gas-lamps." June 19.
11,141.—The New Sunlight Incandescent Company, Ltd., and Lewes, G. H., "Incandescence mantles." June 19.
11,158.—Forrester, S., "Gas-engines." June 20.
11,247.—Heys, W. G., "Internal combustion engines." A communication from J. J. Heilmann. June 21.
11,261.—Nowman, J., "Mantles for incandescent gas lighting." June 21.
11,268.—Gore, J., "Compressing gas or air." June 21.
11,270.—Dowle, A. G., "Illuminant appliance for use with gas or oil burners." June 21.
11,283.—Willans and Robinson, Ltd., and Powel, H. C., "Gas-engines." June 21.
11,296.—Conover, C. F., "Cooling attachments for condensers." June 21.
11,314-15-18-19.—Gardner, E., T. H., & L., "Internal combustion engines." June 22.
11,326.—Birtwistle, R., trading as S. S. Stott and Co., "Elevators and conveyors." June 22.
11,350.—Borch, S. O., "Mixture of carbide of calcium for illuminating purposes." A communication from O. Borch and L. P. Hviid. June 22.
11,369.—Delin, G., "Burners for incandescent gas lighting." June 22.
11,385.—Bray, J. W., "Acetylene gas-burners." June 23.
11,408.—Wilkinson, J., "Treating atmospheric air with the vapours of hydrocarbon oils, and utilizing the product for obtaining light, heat, and power." June 23.

The Price of Gas at Leeds.—At the meeting of the Leeds City Council to-morrow, Mr. Ratcliffe will move that the resolution passed at the last meeting, increasing the price of gas from 2s. to 2s. 3d. per 1000 cubic feet from July 1, be rescinded, and that the advance should not take place until the 1st of January next. The abnormal prices the Gas Committee are obtaining for residuals, Mr. Ratcliffe maintains, will enable them to fully pay their way, in view of the stock of coal they have in hand, to the end of the year, "without robbing the gas consumer."

The Totnes Town Council and the Gas Company.—Further discussion took place at a meeting of the Totnes Town Council last Tuesday respecting the complaint of the advance of 1s. per 1000 cubic feet in the price of gas. The Town Clerk read a letter from the Manager of the Gas Company (Mr. S. Samuel), stating that the Directors had resolved to await the result of the next quarter's consumption, after which the question of concession or reduction (if any) would be further considered. The Mayor (Mr. Windeatt) said he and another member of the Council waited on the Directors as requested. They were met most courteously by the Chairman; but one of the other Directors challenged their right to "dictate" to the Company. They put it to the Directors that the advance of 1s. was excessive, and out of proportion to the increase in other towns, and that a public company with no statutory rights, and dependent upon the local authority for facilities for conducting their business, should regard themselves as not existing entirely for the benefit of the shareholders. They asked them to reduce the increased price, and to allow a discount to large consumers and those who paid promptly. The Directors promised to consider the matter. They had therefore better now await the result of the Directors' deliberations.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following progress was made with Private Bills last week:—

Bills read the first time, and referred to the Examiners: Gas Provisional Order (No. 3) Bill, Oldham Corporation Bill.
Bill read a second time: Gas Provisional Order (No. 3) Bill.
Bills read a second time and committed: British Gaslight Company (Staffordshire Potteries) Bill, Gaslight and Coke, Commercial Gas, and South Metropolitan Gas Companies Bill, Lambeth Water Bill, Local Government Provisional Orders (Gas) Bill, Mid-Kent Water Bill, Portland Urban District Council Gas Bill, Rickmansworth and Uxbridge Valley Water Bill, St. Albans Water Bill, South Metropolitan Gas Bill, Wandsworth and Putney Gas Bill.
Bills reported: Bedford Gas Bill, British Gaslight Company (Staffordshire Potteries) Bill, Local Government Provisional Orders (Gas) Bill.
Bills reported, with amendments: Airdrie, Coatbridge, and District Water Trust Bill, Hartlepool Gas and Water Bill, Morley Corporation Bill, North Warwickshire Water Bill, Wolverhampton Gas Bill, Woodbridge District Water Bill.
Bills read the third time and passed: Local Government Provisional Orders (Gas) Bill, Morecambe Urban District Council (Gas) Bill, North Warwickshire Water Bill, Water Orders Confirmation Bill.
Bills Royal Assented: Cleethorpes Gas Bill, Dorking Water Bill, Fishguard Water and Gas Bill, Glastonbury Corporation Gas Bill, Higham Ferrers Water Bill, Maidenhead Gas Bill, Menstone Water (Transfer) Bill, Newtown and Llanllwchaiarn Urban District Gas Bill, Otley Urban District Council Water Bill, Southport Water Bill.

The Standing Orders Committee reported on Tuesday that the Standing Orders not complied with in respect of the South Metropolitan Gas Bill ought to be dispensed with, and the Bill allowed to proceed. This was agreed to.

Petitions have been presented against the following Bills: Lambeth Water Bill, Mid-Kent Water Bill, Portland Urban District Council Gas Bill, Rickmansworth and Uxbridge Valley Water Bill, South Metropolitan Gas Bill (19 petitions from Local Authorities), Wandsworth and Putney Gas Bill.

HOUSE OF COMMONS.

Monday, June 25.

THE GASLIGHT AND COKE COMPANY'S CHARGES.

Mr. Pickersgill, in accordance with the notice given by him on the previous Thursday, asked the Secretary of State for the Home Department whether his attention had been called to the fact that the Gaslight and Coke Company had just issued notices to their consumers raising the price of gas to 3s. 5d. per 1000 cubic feet, and that these notices stated that the enhanced price would be charged from the date of recording meter indices for the June quarter—the Company thus claiming to charge the enhanced rate for gas consumed during a week or ten days, or even longer, before the notices were served; and whether he would exercise the powers vested in him by section 45 of the Metropolis Gas Act, 1860, which (*inter alia*) provided that if it appeared to the Secretary of State that a Metropolitan Gas Company were acting in a manner unauthorized by law, and it would be for the public advantage that the Gas Company should be restrained from so acting, he might set the Attorney-General in motion to take proceedings at law to restrain the wrongful action of the Company.

Mr. Ritchie (President of the Board of Trade), replying for the Home Secretary, said: I am not aware of any obligation upon the Company to give notice of their intention to raise the price of gas. The obligation to give such notice imposed by the Metropolis Gas Act, 1860, no longer exists. It was superseded by the sliding-scale provisions applicable to the various Companies.

The following further progress was made with Bills last week:—

Bill read the first time and referred to the Examiners: Water Orders Confirmation Bill [Lords].
Bills read a second time and committed: Glyncorrwg Urban District Council Gas Bill [Lords], Margate Corporation Bill [Lords], Westgate and Birchington Water Bill [Lords].
Bill reported: Perth and Paisley Gas Provisional Orders Bill.
Bills reported, with amendments: East Shropshire Water Bill [Lords], Falkirk and District Water Bill [Lords].
Bills read the third time and passed: Bristol Water Bill [Lords], Gas and Water Orders Confirmation Bill [Lords], Gas Provisional Order (No. 3) Bill, Oldham Corporation Bill, Paignton Urban District Water Bill [Lords].

On Wednesday, the order for the second reading of the Water Supply Bill, introduced by Mr. Cornwallis to "amend the law respecting the supply of water by companies and other bodies and persons," was read and discharged, and the Bill withdrawn.

CORPORATIONS AND THE SUPPLY OF ELECTRIC POWER.

An Important Decision.

Our readers are aware that several Bills were brought in at the beginning of the session to enable certain companies to supply electrical energy over large areas. These measures were entitled the County of Durham Electric Power Supply Bill, the Tyneside Electric Power Bill, the Lancashire Electric Power Bill, and the South Wales Electrical Power Distribution Bill; and they were all referred to one Committee, presided over by Sir James Kitson—the other members being Sir A. Scoble, Mr. Bartley, Mr. T. Gair Ashton, Mr. Howard, Mr. Billson, Colonel Long, and Mr. Bonham Carter (Referee). The inquiry began immediately after Easter, and was continued without interruption (except for the Whitsuntide holidays) until last Thursday. At the close

of the cases for and against the first three Bills, the Committee announced their intention of giving their decision on the whole of the measures at once. The South Wales Bill was then proceeded with; and the case for the promoters having closed, Mr. Balfour Browne, Q.C., addressed the Committee on Wednesday in support of the hostile petitions of the Corporations of Cardiff, Swansea, Newport, and Barry. At the conclusion of his speech, the Chairman said the Committee thought the time had arrived when it would be convenient for them to make a declaration. He then read the following statement of their views: "A local authority which undertakes, and is prepared to give, a full and ample supply of electrical energy for all purposes to consumers within its district, ought not, without its consent, to be required to give facilities for the supply within its district of electrical energy by other undertakers. But if a local authority is unable or unwilling to provide, on reasonable terms and within reasonable time, a full and adequate supply of electrical energy, for any purpose to any company or person applying for the same within its district, such company or person should be at liberty, after notice to the local authority, to obtain their supply from other authorized undertakers; and the local authority should be required to give all necessary facilities for this purpose. Any difficulty arising out of the above questions should be subject to arbitration, as provided by the General Acts." Mr. Balfour Browne said he was perfectly prepared to accept the decision of the Committee, and to concede the preamble in view of the Committee's expression of opinion. Other Counsel took up a similar position. The next day, the Chairman made the following further announcement: "The Committee are of opinion that, subject to the principles contained in their declaration being embodied in clauses to be approved, and subject to such additions and amendments in clauses as, on going through the clauses of the Bill, appear necessary, the preamble of the South Wales Electrical Power Distribution Bill is proved. It may be convenient, although the Bills are not down for to-day, to announce also that the preamble of the County of Durham Electric Power Supply Bill is proved; that the preamble of the Tyneside Electric Power Bill is not proved; and that the preamble of the Lancashire Electric Power Bill is proved. The intention of the Committee is to insert, so far as may be applicable, the same conditions in each of the Bills." The Committee then adjourned till to-day (Tuesday), when clauses will be considered.

THE PARLIAMENTARY COMMITTEE ON MUNICIPAL TRADING.

The Joint Committee of the Houses of Lords and Commons, appointed to consider and report as to the principles which should govern the powers given by Bills and Provisional Orders to Municipal and other Local Authorities for industrial enterprise within or beyond the area of their jurisdiction, continued their investigation on the 22nd ult., under the presidency of the Earl of Crewe.*

The first witness called was Mr. E. Garcke, M.Inst.E.E., the Managing-Director of the British Electric Traction Company. He said he was largely in sympathy with the desire of many local authorities to extend their operations in industrial enterprise; but there were certain conditions which, in his opinion, ought to be imposed upon them. He was in favour of the municipalization of industrial undertakings which had for their object the rendering of a public service; but he was most strongly opposed to what was called municipal trading—that was to say, the carrying on of industrial operations by local bodies with the view of making a profit. Any surplus that accrued from such operations should be applied in reduction of price or of capital account, and not to reducing the rates or the provision of other enterprises. He thought it would be a serious thing for the nation if private enterprise were discouraged, because the history of all undertakings proved that local authorities were not able to take the initiative. He was strongly in favour of facilities being given to local bodies to purchase undertakings on fair terms to the capitalist; but he did not think the present terms of expropriation under the Tramways and Electric Lighting Acts were at all fair to the capitalist. Local authorities were actuated at the present time by a feeling of jealousy in regard to the profits made by private enterprise; and they asked themselves why they should not make these profits. His definition of municipal trading would be, any industrial undertaking carried on primarily or partially with a view to making a profit rather than to rendering a public service more efficient. He contended that the price charged by a municipality for a commodity supplied, or for services rendered, ought to include the cost of direct and indirect salaries and wages, a proportion of all standing charges, the full and fair cost of all materials consumed for the purpose of the undertaking, the cost of insurance, a provision for depreciation and wear and tear, and against supersession by new inventions, the amount of the rates that would have been paid by a company, interest on the outlay, and the formation of a sinking fund for the redemption of capital. It would be desirable, he thought, that a portion of these costs should be put on the ratepayers in the form of a rate. The item of interest, for instance, they might very well bear, so that they might be led to look into the conduct of the enterprise. Witness put in a diagram showing thaf municipalities worked electric light undertakings at a profit, though they supplied the current at rather less per unit than private companies. But in many cases the cost of generation was lower; and if allowance were made for the way the accounts were kept, it would be seen that municipalities were in a somewhat better position than companies. In some enterprises it would not be possible to avoid making a profit; but, in his opinion, any surplus over working expenses should be applied to the reduction of capital. There was a danger that municipalities would go in for over-trading if no limit or restriction were put upon their enterprise. There was, of course, the same risk with private enterprise; but in the latter case there were checks which did not exist in the former. As an example of the desire on the part of local authorities to make profits, he said he was engaged on a scheme for converting certain steam tramways in South Staffordshire into electric tramways. One local authority concerned suggested that the electricity should be taken from them. When reminded that they had no power station, and were in treaty with a company to take electricity in bulk from them, they replied that they could buy the current from them and sell it at a profit. Municipal trading, he thought, could not well be carried farther than that. The injury caused by the action of local authorities to the electrical industry of the country was very evident. The Electric Lighting Act of 1888 gave power to private enterprise to undertake electrical supply; but the local authorities, judging from the number of applications for Provisional Orders, thought the power was a valuable possession which they should not part with, and refused their consent in a large number of instances, and applied for Orders themselves. In very few cases, however, did they take steps to establish stations for some years; and when they decided to do so, English manufacturers were not in a position to deal with their demands, and the result was that a large proportion of electrical apparatus was being imported from America.

Mr. Garcke was followed by Mr. A. A. C. Swinton, who gave evidence on very similar lines.

Last Tuesday, the first witness called was Sir Benjamin Browne, the Chairman of Messrs. R. & W. Hawthorn, Leslie, and Co., Limited, shipbuilders, of Newcastle and Hepburn-on-Tyne, and an ex-Mayor of Newcastle. He said his impression was local authorities were not suitable bodies for carrying out any kind of industrial enterprise except as a last resource. They should try, if possible, to get the work taken up by companies or private individuals. If a company failed in their duty, the local or other authority could bring pressure to bear to keep them in order; but if a public body went wrong there was no such controlling authority. With regard to tramways and large schemes of electric power, it was a serious drawback that a local body were not likely to go outside their own area, and, in fact, could not do so profitably without exciting the jealousy of the other body on whose territory they encroached. An industrial enterprise required to be controlled by a group of men such as a Board of Directors, who ought among them to have a large amount of special knowledge for the work in question. Councillors might think they could get over the difficulty by having experienced engineers and officials; but the tendency would be for authority to get into the hands of permanent officials, whereas the Directors should decide, and the officials carry out their decisions. For a corporation to take up an industry was, he thought, an injustice to the ratepayers. In a company, only those who were able and willing among the inhabitants of the district would take shares; but if the enterprise was conducted by the local authority, every ratepayer was forced to become a shareholder.

The next witness was Lord Avebury, who expressed the apprehension he felt at the extension in recent years of the principle of municipal trading. Most Chambers of Commerce, he said, shared his view. Local indebtedness showed an alarming tendency to increase; and this must much affect the security which had hitherto attached to municipal loans. When municipal funds were embarked in trading ventures, there necessarily would be an increase of risk, and the rate of interest would presumably have to be higher than it was now. The supply of water was a somewhat exceptional case; but, generally, the more a municipality had to borrow, the higher the rate of interest. Municipal trading checked private enterprise. A great deal of industrial improvement arose out of new inventions and patents; and it was not likely that municipalities would take up a patent with the risk attaching, nor was it desirable that they should do so. The tendency of corporations having control of the gas supply had been to check the development of electric lighting as a competitor. If electrical power was to be distributed in the cheapest manner, it must be from important centres and over considerable areas. On the labour question, he said it had been generally felt that discussions in the House of Commons on the pay of Government employees were very undesirable; and the same remark applied to those of the County Council. There was increasing difficulty in settling the wages of men, many of whom were the constituents of the Council. The time of the Council in London, as he knew from experience, was now fully occupied; and the present state of the *agenda* indicated the enormous extent of their labours. This already deterred business and professional men from joining the Council. In relation to the housing of the poorer classes in London, he questioned the wisdom of the Council undertaking the erection of houses. As regarded water supply, every case must be considered on its merits; and a controlling authority, to ensure the adequacy and purity of the supply, was an important consideration. He would not lay down any principle for general application; but in regard to any enterprise, the local authorities should have the obligation of showing that there would be public advantage in taking it over. Any extension of municipal trading should not be sanctioned without special parliamentary inquiry, at which other than persons having *locus standi* should have an opportunity of giving evidence. The Borough Funds Act did not, he thought, sufficiently protect the ratepayers' interests in this respect.

On Friday, when Viscount Peel presided, Mr. E. O. Smith, Town Clerk of Birmingham, gave evidence. He said the Corporation owned their gas, water, and electric supply undertakings, and also the markets, baths, tramways, and cemetery. The tramways were at present leased to companies; but, on the expiration of the leases, it was the intention of the Corporation to apply to Parliament for power to work the lines themselves. The Corporation also had a large building estate in the centre of the town, now almost entirely built over, known as Corporation Street. The scheme had been not only a great sanitary but also a great town improvement, and it was now represented by about £40,000 a year in ground-rents, and something like £19,000 in rack-rents on property not sufficiently bad to be pulled down. The Corporation had also acquired 60 or 70 square miles of land in Wales in connection with their water scheme. This was rather a novel departure, and appeared so to Parliament in 1892. But the Corporation came to the conclusion that it would not be worth while undertaking the scheme unless they could get command of the whole watershed, and thus secure that it should be kept clean for the supply of water to Birmingham. There were eight undertakings owned by the Corporation; and the capital invested in them was something like £10,000,000. They made a profit on four of these undertakings, and incurred a loss on the rest. Asked by the Chairman to state which of the concerns he considered came under the head of "municipal trading," witness said that gas, water, and electrical supply, in his opinion, were municipal trading. Markets were scarcely trading, though they were a property from which the Corporation derived a profit. Baths were a sanitary obligation; and

* The previous proceedings were reported in the last Volume of the "JOURNAL," pp. 1503, 1732.

on these there was a loss. Tramways would be municipal trading if the Corporation ran them themselves. The cemetery was an obligation; and the building estate was the result of a public improvement. They made a profit of about £30,000 a year by their gas-works, and this went to the reduction of the price and to the improvement rate. On water they had a loss of £6000, which was rather less than they had anticipated. This loss did not fall upon the rates, but came out of a special water fund authorized by Parliament. It was then put to the witness whether, if these eight undertakings were worked by eight great companies, without competition from other companies, he was of opinion that they would not have given to their respective consumers and customers the same advantages that the Corporation were able to give. He replied: "That is my opinion; and I will go further and say that some of the undertakings would not have been entered upon by a company—the Welsh water scheme, for instance. In Birmingham, as far as I can see, we have got nearly all the powers we want." In answer to other questions, witness said he thought it was extremely difficult to put a limit to municipal enterprise. He thought the practice of Parliament, of considering each case on its merits, was the right one. A general line could not be drawn. He was distinctly opposed to the setting up of a boot and shoe factory for Council employees in competition with private trade with public money, which was not necessitated by the nature of the case. Asked if he saw any danger, political or otherwise, in a municipality having in their employ a vast number of workpeople, he replied: "I do think it is a danger, but it is one which must be faced. I should like to see all corporate employees disfranchized; but I am afraid we cannot go back to that. Up to the present, however, we have not experienced any disadvantage from having a large number of corporation workmen who are also municipal voters."

The Committee adjourned until to-day."

LEGAL INTELLIGENCE.

HIGH COURT OF JUSTICE—CHANCERY DIVISION.

Friday, June 29.

(*Before Justice* BUCKLEY.)

In re Kern's Patent No. 294 of 1897.

This was a petition presented by the Sunlight Company for the revocation of the above-named patent, granted to M. Ottmar Kern, of Paris, on Jan. 5, 1897, for "Improvements in incandescent gas-burners." A full illustrated abstract of the specification was given in the "JOURNAL" for May 10, 1898 (p. 1062).

Mr. BOUSFIELD, Q.C., and Mr. NEILL appeared for the petitioners; Mr. FLETCHER MOULTON, Q.C., Mr. TERRELL, Q.C., Mr. ROGER WALLACE, Q.C., and Mr. WALTER represented the Welsbach Incandescent Gas-Light Company, Limited, the owners of the patent.

As is usual in these cases, the respondents were first heard.

Mr. WALTER (in the temporary absence of Mr. Moulton) stated the facts. He said the patent was attacked on the grounds that the patentee was not the first and true inventor; that it was not useful; that the specification was insufficient; and that it was not novel—the anticipations alleged being De Mare's patent of 1894, and also patents by Moul and Horwitz, though he did not think much reliance was placed on the two latter, or on common knowledge, which was also mentioned. The great advantage of the invention was that it enabled incandescent burners to be used without chimneys, and with a great economy of gas; and it was ridiculous to say that such an invention was not useful. [On the table of the Court was an array of burners and apparatus; and to illustrate this point two of them—one a Kern burner, and the other an ordinary "Gem" burner of the Welsbach manufacture, consuming the same quantity of gas—were lighted, and there was a marked superiority in the light given by the former.] Counsel then went carefully through Kern's specification, explaining the construction of the burner with the aid of models, and then shortly referred to the alleged anticipations, which, he contended, were entirely different in their scope and in the results produced. De Mare did not profess to produce a self-burning mixture, as Kern did; and his burner would not produce it, nor would either of the others. This was the main feature of the invention.

Mr. *Dugald Clerk* was then called. He said he had examined Kern's specification and the alleged anticipations, and he had made apparatus and experiments to test every statement. He explained the action of the ordinary bunsen burner, consuming gas and air in the proportion of about 1 to 4. He said it depended for its operation on the access of outside air to the flame. A proportion of 1 to 6 was an explosive or self-burning mixture. With such a mixture, the rapidity of combustion through it was about 4 feet per second; and this would cause it to light-back, unless the rate of emission were greater than that of propagation of the flame. A self-burning mixture might be made which was not explosive, by having an excess of air; but then the amount of heat was comparatively low. The object of Kern was to produce a self-burning mixture with a bunsen burner fed from an ordinary gas-main, in order to obtain a high temperature without a fan. He accomplished this by the combination of a mixing cone and a suction cone (all of certain proportions), together with a suitable tip for his burner. If the gas and air were not properly mixed, there was a noise during combustion, owing to a succession of small explosions. He had satisfied himself by experiment that Kern's burner gave a self-burning mixture—1 of gas to 6 of air. He said he worked according to fig. 1 in the specification; and he described the mode in which he carried out the experiment. He found that the Kern burner passed 6 cubic feet per minute, while an ordinary bunsen burner would pass 4 cubic feet; the proportion of air in the former case being 6 to 1, and in the latter 4 to 1. The former was about the maximum explosive mixture, and gave a temperature of 2000°. Kern was singularly accurate in his descriptions of phenomena. His burner gave a very high temperature, which was not confined to one particular zone, and was therefore very efficient in heating the mantle. The effect of the nozzle shown in fig. 12 was to make the surface of the flame cylindrical. He had made a burner according to fig. 13, and it produced a very good flame; but a mantle had not yet been made to fit it. Witness then showed an experiment to prove that a self-burning mixture was produced by the Kern burner. He also made an experiment to show the importance of the exact position and dimensions of the two cones, as described in the specification. He had experimented with suction cones of different angles, and found that with angles over 10° they became like ordinary bunsen burners; the shape and character of the flames altered. He had also made an experiment to show that the gas-jet must not be at the upper part of the cone. He had constructed a burner in which the jet could be raised and lowered, and a great difference in the light followed the raising of the jet too high. He had also tested the illuminating power, and found a mantle in a Kern burner gave from 1½ to 2 times the light of an ordinary Welsbach burner. There was no difficulty in putting the specification in practice. He knew of no anticipation of any of the claims. It was the first apparatus he knew of which supplied a self-burning mixture of gas and air from the ordinary gas supply. There were at present about 300,000 of these burners in use; they had only some slight improvements.

Cross-examined: He believed he was right in his first experiment as to the volume of the gas and air passing within 2 per cent. There was a much greater passage of air when the double cones were used than with an ordinary straight tube. The effect of double cones was referred to by De Mare, who laid stress upon its function. The inner cone varied greatly in his different figures.

Mr. BOUSFIELD read several passages in the specification to show that De Mare appreciated the importance of having the proper proportions of air and gas, the right pressure, &c.

Witness assented to this; but he said the effect of what he described was to increase the pressure and to alter the proportions at the same time. In the old De Mare burner, the mixture would never light-back, even if turned down, because it was changed, so that it would not light-back apart from any question of velocity. Mantles were made by the Welsbach Company to fit the No. 4 Kern burner as sold commercially. A burner was produced which Counsel suggested was made exactly in accordance with fig. 4 of De Mare, of a size suitable to the mantles made by the Welsbach Company. Witness said it had been modified—in the size of the holes, for instance. The original drawings were produced, and the dimensions were checked by the witness with the drawings. He said it was not exactly in proportion, but not much out. He had never seen a bunsen burner so large as this. A Kern burner (according to fig. 11) was then produced, made by the petitioners to take a No. 4 mantle as sold by the Welsbach Company. It appeared to be made according to the specification, but he thought there were too few holes, and they were certainly too small. A burner should be specially constructed for the mantle to be used with it. The mantle required to exactly fit the flame. The burner used in 1894 had a head with an annular opening covered with gauze.

Mr. BOUSFIELD said he should have a number of experiments arranged, one of which would show that the De Mare and Kern burners he had been dealing with, produced exactly similar results.

Witness said he believed De Mare used a chimney.

Mr. BOUSFIELD said there was a very slight difference with a chimney—he forgot whether it was better or not.

In further cross-examination, witness said he had made his Kern burner to consume 80 litres per hour, as mentioned in the specification, and compared it with a Welsbach burner passing the same quantity. He produced models which he had made according to the various figures in De Mare's specification. One of them smoked a little, or rather showed a white tip, which proved that there was too much gas for the air. He had imitated the size of the hole from the drawing, as nearly as possible. He thought this was the right thing to do. He had not tried more than one head with De Mare's No. 4 burner, because he found the mixture was 2 to 1; and no kind of head would have made it a good burner. The model of fig. 1, which gave a smoky flame, passed about 3½ cubic feet of gas, which was about the right quantity for that size. He had not experimented with fig. 2. He had increased the number of air-holes to try to reduce the smokiness. No. 2 gave a mixture of 2 to 1. This also passed 3½ cubic feet per hour with the De Mare cone in; with the cone out it consumed 3·6 feet. As an ordinary bunsen it would require 4 feet to burn properly. He did not agree that he had passed too much gas through, but he would make a further experiment with a smaller gas-inlet. Another model of fig. 1, made by petitioners, with a modification as suggested in the specification, was next put to the witness; and he said it was not on the same scale as the drawing, which might make a difference in the result, as it altered the resistances. The drawing was on a good working scale. The lower cone was different in form from the one shown in fig. 1 or fig. 2; it was much deeper. It made it a better injector.

Saturday, June 30.

On the resumption of the proceedings this morning,

Mr. *Dugald Clerk* was further cross-examined by Mr. BOUSFIELD. The first point the learned Counsel dealt with was the witness's experiment to show the velocity with which the mixture of air and gas passed through an ordinary bunsen and a Kern burner respectively. Witness would not admit that his results were 50 per cent. wrong. He did not agree that the passage of air or gas through a long glass tube was analogous to the current of water in a river, in which a cork in the middle might travel very much faster than one near the banks. There would have been great difficulties in the way of measuring the velocities by a meter. A method of doing this was then suggested by Counsel, in detail. He did not agree that the illuminating power of the Kern burner was about 10 candles per cubic foot. He found it considerably above this; but he would assume that. A diagram was put to him indicating results of experiments carried out by petitioners with a Kern burner as made by them from the specification, and consuming 3·6 cubic feet per hour. His criticism upon it was that the burner in question was too large, and the consumption of gas much too low for such a burner. He considered there were indications in the specification to show the proportions necessary for any size of burner required; the important point was the velocity, or rate of consumption. An almost identical diagram resulting from similar experiments with the respondents' own model was then submitted to the witness, and he said he could not explain it without repeating the experiment himself. Bunsen burners with an adjustment

for altering the air supply were very common. One of these was produced and lighted, and considerable discussion ensued as to the chemical changes going on in the different zones of the flame. An experiment was then shown with a similar burner placed in the bottom of a glass tube, which was again enclosed air-tight in a somewhat larger one, and the admission of air so regulated that the blue or green cone descended and rested on the top of the first tube, while the other gases burned at the top of the second tube, where the carbonic oxide and hydrogen took the necessary oxygen from the outer air. The advantage of the self-burning mixture was that one got rid of all fine distinctions between the zones of combustion. Witness did not agree that in the Kern burner a portion of the oxygen necessary for complete combustion was obtained from the atmosphere at the surface of the mantle, and that it was this fact which made it so efficient. The paper by Messrs. Smithells and Ingle at the Chemical Society in 1892* was then read; but the witness would not agree that the result was to show that the hottest portion of the flame of a Kern burner was in the interior of the cone of combustion. The flame must fit the mantle fairly well; but it was of less importance with the Kern burner than with those of the ordinary kind. The flame came through the interstices of the mantle. Witness then described the result of experiments he had made since the preceding day with petitioners' models of Kern and De Mare burners. In one case, the burner consumed 4·6 cubic feet, and gave a light which he called 1, while the other, consuming 3·8 cubic feet, gave a light of 1·2; or calculating for an equal consumption of gas, the illumination was as 145 to 100, the Kern being the superior. He then recounted the results of several other comparative experiments he had made, the general conclusion being that the Kern gave a better duty than the De Mare. Questions were then asked as to the operation of the lower or "mixing" cone as respondents called it. It was important to have the air and gas thoroughly mixed, or else the flame flickered; insufficient velocity also caused flickering. The proper mixture depended on the distance between the gas-jet and the top of the mixing cone and the angle. A portion of the cross-examination had to be deferred because the bottle of gas used for the experiments was exhausted; and a few questions on the Harwitz and Moul patents concluded the proceedings for the day. Witness could not admit that there was any anticipation of Kern in either patent.

A Gas Manager's Money-Lending Transactions.

At the last Devon Summer Assizes, before Mr. Justice Lawrance and a Jury, an action was brought by Mr. H. Fisher, of Vinnicombe Farm, near Crediton, against Mr. T. Stormonth, described as a "money lender," of Exeter, for £150 damages for libel. The defendant counter-claimed for damages for the detention of goods. The dispute arose in connection with a loan of £45, for which plaintiff was to pay interest at the rate of £3 9s. a month. The farming business was not successful, and an agreement was entered into under which the concern was to be carried on by the parties in partnership. After a time the defendant issued a number of posters to the effect that the plaintiff's goods had been seized under distress for rent, and were to be sold without reserve. It was alleged by the plaintiff that there was no truth in this statement, which constituted the libel. For the defence, it was stated that Fisher was anxious for the sale to take place, as there was more stock on the farm than could be kept, and that the words "seized for rent" were put in the bill with his consent. Defendant, in the course of his evidence, said he was a gas engineer, and was at one time Manager of the Teignmouth Gas-Works; but he could not get enough money at that, and therefore he had to get a living any way he could. He stated that he had lost by lending money. Plaintiff's Counsel remarked that £3 9s. a month was rather good interest on £45. Eventually the Jury found for the plaintiff on both the claim and the counter-claim, and awarded him £150 damages.

New Capital for the East Grinstead Gas and Water Company.—At a meeting of the East Grinstead Gas and Water Company last Thursday, the shareholders authorized the Directors to increase the capital by the creation of 800 additional "C" shares of £10 each.

New Joint-Stock Companies.—Under the title of Metropolitan Gas-Meters, Limited, Frank Wright's Prepayment Gas-Meter Corporation, Limited, has been reconstructed, with a capital of £60,000, in 10s. shares, to adopt and carry into effect a certain agreement, and generally to carry on the businesses of manufacturers of and dealers in coin-freed and prepayment gas-meters, or any other meters for recording the supply of gas, oil, spirits, and other light and heat producing agents; and also the businesses of producers and suppliers of gas and electricity for the purposes of light, heat, or power, of general, mechanical, electrical, and hydraulic engineers, ironfounders, &c. The Direct Automatic Oil Lighting Syndicate, Limited, has been registered with a capital of £100, in £1 shares, to adopt an agreement with W. Butler, and carry on the business of a mineral oil illuminating Company.

Fatal Accident at the Tipton Gas-Works.—Last Friday, Mr. F. W. Ensor, Deputy Coroner, held an inquest at the Town Hall, Dudley, concerning the death of William Henry Rogers (41), who died from injuries sustained while employed at the Tipton Gas-Works. Deceased was engaged on the previous Tuesday in shunting coal, with a young and spirited horse attached to the waggon. The horse, in starting, stumbled and fell, and on regaining its feet became detached from the waggon, and rushed between the rails and a wall of coal. Deceased followed, and while running with the horse they were overtaken by the waggon. Horse, man, and waggon then travelled together for about 20 yards, and as deceased was endeavouring to get in front of the animal he was knocked down, and the truck passed over his right leg. He was removed to the Guest Hospital, and died on Wednesday. A man named Johnson, employed at the gas-works, said he did not think the distance between the rails and the wall of coal sufficient to allow a man to regain his feet if knocked down. Mr. W. H. Jukes, Surveyor to the Council, said the stacks of coal were about 8 feet high, and the distance between the sides of a waggon and the coal was about 2 ft. 9 in. The Factory Inspector (Mr. J. H. Nicholl) said there should be a clear interval of not less than 3 feet between railway lines and stacks of coal. Here it was greater. A verdict of "Accidental death" was returned.

See "JOURNAL," Vol. LIX., p. 68.

MISCELLANEOUS NEWS.

THE INCREASED PRICE OF GAS IN THE METROPOLIS.

The Corporation of London and the Increase—Suggested Supply of Non-Luminous Gas.

At the Meeting of the Court of Common Council of the City of London last Thursday, a letter was received from the Gaslight and Coke Company, stating that, in consequence of the serious increase in the price of coal, they had been compelled to increase the price of gas supplied by them in their district north of the Thames (except for that consumed in the street-lamps) from 2s. 11d. to 3s. 5d. per 1000 cubic feet, as from the date of recording the meter indices for the current quarter. On the reading of the letter,

Mr. A. A. WOOD moved that the question be referred to the Streets Committee for their consideration, as the increase was a grievance which affected every citizen of the Metropolis, and should not be allowed to pass unheeded. He said that what was required was a non-illuminating gas which could be used with incandescent mantles and for heating, cooking, and motive-power purposes. Such gas could be supplied for less than 2s. per 1000 cubic feet; and it was within the right of the Corporation to enter into competition with the Company and provide it. In his opinion, the gas consumers north of the Thames had been very unfairly treated; for in addition to a very large difference in price as compared with that charged by the South Metropolitan Company, they were now to be saddled with an extra 6d. He therefore moved that the whole question go to the Streets Committee with his suggestion as to a competitive supply of non-luminous gas.

Mr. J. JUDD seconded the motion, and stated that a good water gas could be manufactured, suitable for heating, cooking, and motive-power users, for 5d. per 1000 cubic feet.

Mr. WALLINGTON suggested that the proper Committee to consider the matter would be the County Purposes Committee, as they carried out the provisions of the Acts of Parliament relating to the testing of gas.

Mr. A. C. MORTON twitted the County Purposes Committee with having given evidence in favour of the Gas Companies before the House of Commons this session, and urged this as a reason why the matter should not go to them, but to the Streets Committee, who, he said, were, and had been, working hard in the interests of the ratepayers during the last two or three years, and were trying to save them £50,000 per annum on the public lighting. He pointed out that the difference in the price charged by the two Companies north and south of the Thames was now 13d. per 1000 cubic feet. The Corporation had stood by the ratepayers in 1868, in 1876, when the sliding-scale was introduced, and in 1883, at the time of the amalgamation with the London Company. But the Gaslight and Coke Company, after swallowing up all the little Companies of the Metropolis, and becoming a giant monopoly, had broken all their promises; and therefore, as a protest against this monopolist Company, he trusted the resolution would be carried.

The motion was carried unanimously.

Mr. C. T. HARRIS then moved that Mr. Wood be especially added to the Streets Committee for the purposes of the reference; and the proposition was agreed to.

Further Advance by the South Metropolitan Gas Company—Interview with Mr. Livesey.

In view of the announcement by the Gaslight and Coke Company, of their intention to raise their price 6d. per 1000 cubic feet, a representative of the "Daily News" called a few days ago upon Mr. Livesey to talk over the matter with him; and last Friday the result of the interview was published in that paper, accompanied by an announcement of a further rise of 4d. on the south side of the river. The interviewer says one is apt to think of Mr. Livesey as "the most ruthless of critics of the great Gaslight and Coke Company;" and naturally he expected to hear some sharp comments on their management. In this, however, he was mistaken. He was, in fact, "struck with the light of sympathetic benevolence that the mention of the other Company called forth," instead of the "stern aspect of the censor" he remembered on the last occasion he had called upon him. The reason of this change very soon became apparent. Mr. Livesey confessed that he thought the northern Company were quite justified in the advance they have made; and he added: "We are going up too. We are going to put on another 4d. from Midsummer. That will make 7d. against their 6d." He went on to explain that the larger Company would have had to go up 7d. too, only they were fortunate enough to have an undivided balance of £193,000 from last year, which helped them to some extent. The South Metropolitan Company would, he said, have had a balance of £90,000, but they reduced the price of gas by 2d. per 1000 cubic feet eighteen months ago. He thought the Gaslight and Coke Company would have been quite justified in putting on 7d.; and the only fault he found with them was that they made the announcement of the rise without explaining the reason for it. He went on to inform his interviewer that he had just drawn up an explanatory circular which was to be sent out to his Company's consumers; and he proceeded to read it. This "doleful document," says the interviewer, "was couched in the most suave and conciliatory language, that certainly might be expected to modify the indignation of the gas consumers of South London if anything could do it." [The text of the circular referred to is given below.] But Mr. Livesey hastened to point out to his interviewer that, under the profit-sharing system, the Company's officers and workmen will by the increased price lose £25,000. Asked how the employees were going to take this, he said the two workmen Directors on the Board had talked it over with some of them, and he believed they saw the necessity for it, and would accept the inevitable, like sensible men. He was not altogether sorry that they would be affected by the rise in price, because it was objected, when the profit-sharing scheme was proposed, that it might work very well when profits were good, but the question was whether it would do so when they went down, or disappeared altogether. "Now," said Mr. Livesey, "we shall see. I said then, and I still believe, that the men would take a sensible view of things, and would be prepared to take bad times with good; and I am not altogether sorry to have the matter tested." His interviewer put the supposition of the high price of coal being permanent, and he

asked how the men would take the loss of their share of the profits. Mr. Livesey promptly replied that he felt sure it would not be permanent. Such was his confidence of this that he had taken the risk of making contracts for only six months ahead. He acknowledged that it was a "great risk," and but one other gas company—the Crystal Palace—had, he said, ventured to do likewise. Asked the grounds of his confidence, Mr. Livesey said the main cause of the advance in the price of coal was the extraordinary activity in the iron trade. But he had the best reasons for believing that the rush in this trade was over. Orders were falling everywhere; and the exceptional demand for coal was practically at an end. When the contracts now in hand were got off, things would be slack, and the price of coal was bound to go down. It was just the same in 1873. Prices were even higher then than now. Coal went up from 6s. per ton in 1871 to 20s. in 1873; and the cause was just the same—the great activity of the iron trade. Mr. Livesey added that the coalowners were believed to have made something like 60 millions of money, which was reckoned to be about what the South African war would cost. They were having a good time now; but they had had some very bad times in years gone by, and were only making up losses.

In the circular referred to by Mr. Livesey in the course of the interview, the Directors express their great regret at having to inform the consumers that the extremely high price of gas coal has been rather more than maintained during the three months which have elapsed since the issue with the March accounts of the notification of the increase of 3d. per 1000 cubic feet,* and that contracts which were made in 1899, at the high figure of 8s. per ton in the Tyne, have this year been taken at 16s., while freights have also advanced. Coal now costs the Company about 10s. per ton more than in 1898; and so far coke, on the average of contracts and the retail trade, has only realized about 4s. per ton advance. This is only equal to 2s. per ton on the price of coal, because each ton of coal produces half a ton of coke for sale. The price of gas must therefore, they say, be increased to 2s. 8d. per 1000 cubic feet from Midsummer. At this price, by the operation of the sliding-scale, by which, as the price rises the dividend falls, the dividend payable to the shareholders will be reduced by £40,000. The Company's profit-sharing system is simply an extension of the sliding-scale to the employees. For each 1d. reduction below 2s. 8d. per 1000 feet, a fixed percentage on their salaries and wages is paid annually. This now amounts to 9 per cent., and will all disappear until the price again falls below 2s. 8d. The officers and workmen will thus lose about £25,000 in twelve months. Consumers, shareholders, and employees have been partners in prosperity; they now become sharers in adversity. Any remaining deficiency must be drawn from the reserve funds, which unfortunately are small. Had the price of gas not been reduced 2d. per 1000 cubic feet during the last 18 months, there would have been a further £90,000 in hand. The Directors again take the opportunity of correcting the common mistake of supposing that the shareholders receive large dividends. Since 1876 Parliament has ordered that all new capital shall be raised under the auction clauses—that is, it has to be issued to the public at the market price, which only yields 3¾ per cent. to the purchaser. In the last ten years, the consumers have thus invested over £600,000 in the Company's stock, on which this small rate of interest will be temporarily reduced, as a consequence of the increase in the price of gas. The Directors do not believe that this excessive price of coal can be much longer maintained. They say they have the strongest reasons for reducing the price of gas, and will use their utmost efforts to do so as soon as possible.

The Crystal Palace Gas Company's Increase.

The Directors of the Crystal Palace District Gas Company have also offered some explanation on this subject to their customers. In a circular lately issued by the Secretary (Mr. Charles M. Ohren) they express regret at there being no reduction in the price of coal since the notice of increase was sent out in March. They say that contracts have been made at about double the price of last year, and, in addition, freights are also higher. About one-fourth of the extra expenditure on coal will probably be met by the increased value of coke. This will leave a deficiency equal to about 8d. per 1000 cubic feet of gas sold. The price of gas was raised 2d. from the March quarter; and the Directors now give notice that a further increase of like amount will be made from Midsummer; thus bringing up the price to 2s. 10d. per 1000 cubic feet. The consumers, therefore, bear one-half of the loss. The other half will be met by drawing on the reserves, by reducing the dividend to the shareholders under the operation of the sliding-scale, and by a reduction of the profit-sharing bonus of the employees, which, being based on the principle of that scale, falls as the price of gas rises, and *vice versâ*. Thus consumers, shareholders, and employees are partners in adversity as in prosperity. Under these circumstances, the Directors think it scarcely necessary to say that they will reduce the price of gas at the earliest possible moment.

* In the March circular notifying the first increase of 3d., the Directors offered the following explanation of the circumstances which had led to this step: "The Company's coal contracts, free on board in the Tyne, made a year ago, were at a material (about 20 per cent.) advance, which has been to a considerable extent met by increased receipts for coke. The coal contracts expire this month, and the prices demanded for Newcastle gas coal are 100 per cent. in excess of those of last year; and, unfortunately, little, if any, further advance in the value of coke can be expected. The greater part of the burden must, therefore, fall upon the gas consumers. To meet the extra cost of coal, not less than 8d. per 1000 feet is necessary; but in the hope that the present extreme price of coal may not be maintained throughout the ensuing twelve months, the Directors have resolved to try a moderate advance of 3d.—making the price 2s. 4d. per 1000 feet. They feel this explanation is due to the consumers because the sliding-scale makes them partners with the shareholders—losses and profits being shared. Every reduction of price entitles the shareholders to an increase, while advances in price entail corresponding reductions, of dividend."

THE REGULATION OF LONDON STREETS.

The Opening of Roads by Gas, Water, and Electric Light Companies.

At the County Hall, Spring Gardens, last Friday, a conference was held between the London County Council and representatives of the various Authorities engaged in the administration of local affairs in the Metropolis relative to matters in regard to which it is considered improvement may be effected. Mr. W. H. Dickinson, the Chairman, presided; and there were present about 160 delegates, representing 40 different authorities. The *agenda* paper comprised eight closely-printed foolscap pages. Seven of them contained nothing of special interest to our readers; but on the last page, and close to the end, appeared some references to the opening of roads.

The St. Giles District Board had given notice that they would desire the conference to consider as to whether the time had not arrived when some greater authority should be vested in local bodies to control the operations of the gas, water, and other companies possessing statutory powers of breaking up the public ways. This was referred to a Committee, consisting of representatives of the various Authorities attending, to consider and report to a further conference to be held later.

On behalf of the Holborn District Board, Mr. L. H. Isaacs, the Surveyor to the Board, had given notice of the following motion: "This meeting is of opinion that the time has arrived for concerted action on the part of the Local Authorities of the Metropolis, to remedy the inconvenience, annoyance, and loss of time and money now caused by the operations of the gas, water, telephone, and electric lighting companies, in laying down, renewing, maintaining, and repairing their mains, pipes, services, and wires, and that it be referred to a Committee of this conference to consider and report on the advisability of constructing subways in the leading thoroughfares of the Metropolis with that object." This was also referred to the Committee.

The Vestry of Islington had suggested that the provision of the Metropolis Management Acts respecting the opening of roads, and reinstating after opening, should be made to apply to the London County Council.

The Chairman really did not think this was strictly within the reference. He did not know that there was any great advantage to be gained in discussing the merits of either one way or the other.

Mr. J. G. White: It might go to the Committee.

Mr. A. C. Morton: It is a very useful matter.

Mr. Henry Clarke said they ought to take some means to show that the London County Council had not done their duty in regard to this.

A Representative said if they would allow him he would give an example in point. There was a road in his district in which the Works Department of the London County Council had been executing certain works in connection with the Hackney Wick sewer. Had it been done by a contractor, he should have insisted that the roadway should have been kept open the whole time, and then there would have been plenty of room for them to do the work. Instead of that, the Council's Works Manager applied for permission to close a short length of the road. He obtained the permission; but he went on afterwards and said that, acting upon the advice of the Engineer of the Council, he found he had a perfect right to close their roads as long as he wanted. They could keep them closed until they had finished the work. If they did the work in the way that the Local Authority desired, it would cost them a little more; and unless the Engineer would allow him a little extra on that, he could not do it.

It was then agreed to refer the matter to the Committee.

This was all that transpired on matters of interest to our readers.

GAS, INDUSTRIAL, AND GENERAL ILLUMINATING EXHIBITIONS.

In the "Journal" for Jan. 2 and 9 last, we gave extended notices of the exhibition of gas lighting, heating, cooking, and other appliances which was then being held at the Royal Aquarium. Whatever the general results and effect of that exhibition may have been (and no one can tell the extent of the influence of such a show), as a convenient and attractive presentment of most of the best and latest inventions in the several directions in which gas is now utilized, it was undoubtedly an unqualified success. The benefits of the exhibition, however, were to a very large extent confined to London and the suburbs; and it is therefore pleasing to learn that exhibitions on similar lines are being organized for other parts of the country. This will no doubt be an inducement to a large number of provincial manufacturers to show their goods in friendly competition with the firms who exhibited at the Aquarium, and the greater part of whom, we are informed, have already signified their intention of putting in an appearance at the forthcoming exhibitions. Better testimony of the success of the Aquarium exhibition could not be given. Arrangements for two exhibitions are already being vigorously developed by the management, which includes Mr. T. G. S. Hersey, one of the chief organizers of the display at the Aquarium. The first one is to be held in Manchester; and St. James's Hall has been engaged for the purpose. It is admirably suited for an exhibition of this nature. It is proposed to divide it into six different departments; each having from five to nine sections. Department "A" is to be devoted to gas cooking and heating; "B" to gas lighting (indoor and outdoor); "C" to gas-engines; "D" to gas plant; "E" to gas-plant photos and models; and "F" to a laboratory for gas analysis and light and heat testing, with the necessary equipments. The time of year for the exhibition has been chosen after consultation with former exhibitors, as being the most convenient before the busy winter season commences. It will open on Sept. 9, and terminate on Sept. 30. After this it is proposed to visit Bristol, for which purpose the large Hall known as the Bristol Rifle Drill Hall has been taken. It is understood that special terms are being offered to firms electing to be represented at both. Military bands will be secured for Manchester and Bristol; and this will prove an additional attraction. The exhibitions are intended to be the precursors of a far larger undertaking—namely, an International Gas Engineering Exhibition, which will include exhibits from all parts of the world, to be held in London some time next year. We are not in a position to state the precise locality chosen for this, as negotiations are pending. It is, however, proposed to have gold and silver awards, with the usual diplomas and certificates of merit; and it is hoped to form a strong Committee to adjudicate upon the exhibits. These are the proposals; and it will rest with the manufacturers of gas apparatus and appliances to carry them to a successful issue. Meanwhile, we may state that interested firms who desire further information can obtain it of Mr. T. G. S. Hersey, 39, Seething Lane, E.C., or St. James' Hall, Manchester.

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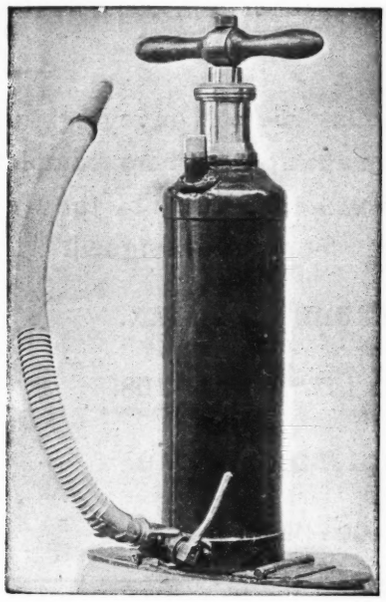

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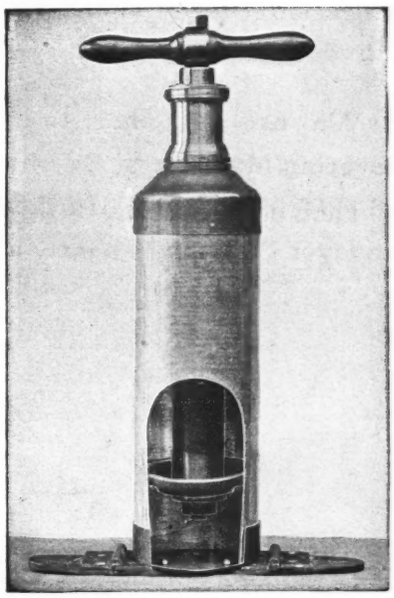

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A "NEEDFUL" EXPLANATION.

We note an Advertisement in the "JOURNAL," under the name of the NEW CONVEYOR COMPANY, stating that they had taken over the business of the AUTOMATIC COAL-GAS RETORT COMPANY, LIMITED; and, as it may create a false impression, we beg to say there are **NO VALID PATENTS** existing in connection with Inclined Retorts (beyond a few small and subsidiary ones, dealing with details).

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PLYMOUTH AND STONEHOUSE GAS COMPANY.

The Annual Meeting of this Company was held last Thursday—Mr. J. A. Bellamy in the chair.

The Secretary (Mr. H. B. Heath) having read the notice convening the meeting, the report of the Directors was presented. In the course thereof they stated that, after payment of the authorized dividend in January last, together with interest on the debenture stock, there remained to the credit of profit and loss the sum of £15,622, from which they recommended the payment of a dividend for the half year ending the 31st of March of 6½ per cent. on the ordinary stock, 9s. 9d. per share on the additional shares, and 9s. 3d. per share on the new shares issued under the Act of 1879, free of income-tax; leaving a balance of £7933 to be carried to the credit of the next account. In consequence of the advance in the price of coals—about 100 per cent. over the contract price of last year—and of oil, the Directors found it necessary to raise the price of gas 6d. per 1000 cubic feet from the date of reading the meters for the Midsummer quarter. It had, however, been decided not to alter at present the slot-meter charge for gas. The Directors hoped that the abnormally high price of coals would only be temporary, and, as the slot-meter consumers belonged exclusively to the working classes, it was felt that the Company might probably allow the price of gas to remain unaltered during the present financial year. Mr. G. Henderson, who had been Chairman of the Company for more than twenty years, decided, in consequence of the state of his health and advanced age, to resign his position on the Board. The Directors much regretted this decision, and tendered him their grateful acknowledgment for the invaluable services rendered by him to the Company from the commencement. Mr. J. A. Bellamy had been elected Chairman, and Mr. Joseph Wills Deputy-Chairman of the Company. The Directors recorded with deep regret the loss sustained by the Company through the death of Mr. John Thomas, who for twenty-one years faithfully discharged the duties of Secretary. Mr. H. B. Heath, who had been in the Company's service for thirty years, had been appointed to fill the vacancy.

The Chairman, in moving the adoption of the report, remarked that during the past year a large amount of capital had been expended on stoves. At the end of March they had 1721 out on hire to ordinary consumers, and 4821 slot-meter stoves. Success of the most exceptional character had come upon them in this new business. This, with the natural growth of the town, had resulted in an increase of gas sold of 14·3 per cent.—the greatest in any one year in the history of the Company. They felt specially proud of this fact, as it was the first year they had had the competition of the electric light. The wages bill per 1000 feet of gas sold was 2·22d., which was the lowest on record. Then the gas produced per ton of coal carbonized—10,546 feet—had also been very satisfactory. During part of the year they had had to use very expensive coal. Owing to the increase in the demand, the coal contracted for was insufficient, and they were compelled to go into the open market for about 6000 tons, which they had to buy at a very high price indeed. Freights also had ruled extremely high throughout the year. Notwithstanding this fact, the balance-sheet was very satisfactory. They had done considerably better than in the previous year; they were declaring their maximum dividend, and had not drawn anything from their reserve fund. With regard to the supply of coal, difficulty was experienced in getting delivery; and they were indebted to the Devonport Gas Company for letting them have half-a-cargo in order to replenish their stores when they had run very low. During the year, 6879 yards of mains had been laid and renewed, and 2642 yards of slot-meter service-pipes put in. A new wharf had been built to facilitate the discharge of coal; and arrangements were being made which would cheapen the cost of labour in that operation. In Plymouth, the Corporation were lighting the town with incandescent burners. Similar work had been carried out by the Company in Stonehouse; and it would be found that this was the better lighted. After alluding to the changes in the directorate, the management, and the secretaryship, the Chairman went on to speak of the increase in the price of gas. He remarked that when coal had to be bought and paid for at a figure 100 per cent. higher than in the preceding year, it was quite evident that gas could not be manufactured at the same price as before; and in fixing the increase at 6d. per 1000 cubic feet, the Directors had taken into account the extra amount they would make out of coke and sulphate of ammonia. He believed the increase of 6d. would not continue more than twelve months. The price of coals, even if not brought down to the former level, would be considerably reduced by the time they had to go on the market again for their contracts. They had not made any alteration in the slot-meter charges for two reasons. One was that the meters were arranged to supply a certain number of feet of gas for 1d., and the expense of altering them now and again when the price of gas went down would be very considerable. Then the Directors thought it was best to sacrifice a little in the charge for the hire of stoves let out to the working classes, rather than interfere with an arrangement which had worked so satisfactorily and become so popular. With regard to capital, the whole of that authorized by their Act of 1894 had been expended with the exception of £20,000 of debentures, for which tenders had been invited. The shareholders would consequently be asked that day to authorize the issue of £30,000 of stock under the Act of 1898. With reference to the future of the gas industry in England, a recent departure had been made which seemed to open a new era of improved prosperity. Legislation had for years always been in the direction of increasing the candle power of gas supplied; but this year for the first time a reaction had set in, and the South Metropolitan Gas Company had promoted a Bill, which had passed the Commons, enabling them to make gas of one candle power less than before. The introduction of the incandescent gas-mantle had brought about a revolution in gas illumination, and it was believed that as soon as the patent for mantles in this country ran out the step taken by the South Metropolitan Company would be followed by others, and gas companies would send out gas of low candle power. Last year they spent no less than £23,000 for artificially increasing the illuminating power of gas in Plymouth. If legislation permitted the supply of low-power gas—and it was done in Germany in most large towns with complete success—he looked forward to the time when gas would be supplied in Plymouth at 1s. 6d. per 1000 feet. He concluded by paying a tribute to the efficiency of the staff and workpeople.

Mr. J. Wills seconded the motion, and it was carried and the dividends declared.

A special meeting was afterwards held, at which the Directors were authorized to issue £30,000 of ordinary stock.

The proceedings then closed.

LEICESTER CORPORATION GAS SUPPLY.

Increase in Price—The Coal Difficulty.

At the Meeting of the Leicester Town Council last Tuesday, the Gas and Electric Lighting Committee reported that, owing to the increased cost of coal for the ensuing year, representing a sum of £45,000, they had had under consideration the expediency of advancing the price of gas; and they recommended the Council to increase it 2d. per 1000 cubic feet for all purposes as from June 30.

Alderman Lennard, in moving the adoption of the report, said he thought it was due to the Council to explain the enormous advance which had taken place in the price of coal. It was quite unprecedented—the leap of 5s. per ton which they were now paying being the largest ever known in the coal trade. From 1896 to 1899 it went up but little. The three first years the price went up 6d.; last year it rose 1s. 6d.; and this year it bounded up 5s.—making a total of 7s. 6d. per ton advance since 1896. The average price they were paying now was 16s., or just double what it was in 1883. The £45,000 mentioned in the report was the advance they would have to pay for the coal alone; the quantity carbonized now being 180,000 tons per annum. In addition to this sum, there was an item, which for the moment he would call "extras," which he would deal with later; and this would amount to a further £3000. There was a very melancholy satisfaction in reflecting that everybody else had had to do as Leicester was doing. It was not only gas coal that had gone up, but steam coal as well; and the railway companies would be just as hard hit as the gas corporations. He saw that the Great Eastern and Lancashire and Yorkshire Railways had concluded their coal contracts at 5s. 6d. per ton advance. There was no sign at present of any immediate relief; but there were plenty of signs that at the expiration of another year things would be very different. The advance was due to a combination of circumstances which had enabled the colliery proprietors to band together to fix the prices, from which they had never budged an inch, and to make conditions which they had not altered since they stated them. Chief among these they had the extraordinary foreign demand arising during the last two or three years. He thought this took its rise immediately at the close of the American-Spanish war, when Governments throughout the world realized that fleets were no good without coal. Immediately they began filling their naval stations with large stocks. Then, again, they had had great industrial activity on the Continent; and combined therewith came a series of strikes in Bohemia (a large coalfield), Belgium, and France. This followed on the strike in South Wales, which was a large source of supply for Continental markets. This caused a shrinkage of stocks, and a large number of the Continental people came to England, not only for an ordinary, but for an excessive supply. The Russian demand had been exceptionally great—so great, in fact, that Russia had taken off its duty from coal, and had also prohibited the export of oil. But they knew that this extraordinary foreign demand could not continue; and sooner or later, owing to many circumstances which he would not go into, he was afraid there would be brought about, not only a return to normal conditions, but a positive decline from them. Then, of course, they had had extraordinary activity in the iron and steel and shipbuilding trades all round the country; and this also put up the demand at home. But with regard to that, the summit had been passed. Orders were not being booked for new ships; and soon they would have evidence that there was a large decline in this industry. Of course, the present extraordinary advance would force a drop, because manufacturers would not go on buying; they would sooner close down their works. It was not, therefore, likely that after this year they would have to pay prices they were called upon to pay now. The advance in the prices this year meant an increased cost of £48,000. This would be 7½d. per 1000 cubic feet on the price of gas if they were going to ask the consumers for it all at once. There had been a general advance throughout the country, varying from 2d. to 6d. per 1000 feet, and the Committee had hoped that there would be no necessity to ask for an advance; but, after an investigation of all the circumstances, and what they thought might probably happen in the immediate future, they felt they would be justified in asking for 2d. per 1000 feet. This would bring them in £13,000 out of the £48,000, and they hoped to get another £13,000 from extra prices for residuals. From an improved method of manufacture, which they had already instituted, they hoped to get another £8000 or £10,000. The rest must come from the usual amount which had been handed over to the rates. Fortunately, their Chancellor of the Exchequer only estimated £10,000 this year; and they would probably be able to manage this and a little more. They had recommended this plan as being the most equitable division between the consumer and the ratepayer. They did not think it would be right to clap all of it on to the ratepayer, and not right to charge it entirely to the consumer. With regard to what he had said respecting improved methods of manufacture, for years it had been a universal custom, not in this country only, to use expensive enriching materials for gas making, which, while giving very satisfactory photometric tests, had been of no practical value whatever to the consumer, but rather a disadvantage. New methods had now arisen, and in many towns in North Germany they had proved satisfactory beyond the utmost expectation. They would have to be adopted in England; and the Committee had already, to a certain extent, adopted them with good results. But whatever they could do in manufacturing economically, it was as nothing compared with what the consumers could do for themselves. Occasionally they heard complaints about bad gas; but the majority of those which came before them were due to unsuitable burners or to neglect to change them after they had been in use a number of years. If consumers would see that they had good burners, they could help themselves considerably in the matter of improving their gas. The strongest advice he could give the consumers was: "See to your fittings;" and they would find that the incandescent gas-burners would be more economical than the others, and would give greater illuminating power. These burners would be getting cheaper

every year, and would be within the reach of everyone. In many towns in Germany, upwards of 90 per cent. of the lighting, including the street lighting, was done by the incandescent system. He was glad the Council were not led into lighting Leicester streets by electricity, as they now found that in Berlin—one of the most forward and up-to-date cities on the Continent—the authorities had abolished all the electric lights in the streets, and were using incandescent gas-burners. The colliery proprietors had not only put up the prices of coal, but had imposed new conditions as to the methods of purchasing. They had torn off the little slip which required them to observe recognized rates of wages. The Corporation had also had in their agreements a strike clause, which was found so useful in the year 1893. The Corporation did not feel that when there was a strike they ought to impose a penalty, but they did think they had the right to insist on the penalty when there was a lock-out; and in 1893 they insisted on those conditions being observed. Now, however, the colliery proprietors would not hold themselves liable to fulfil their contracts when there was a lock-out. From whatever cause, therefore, the contracts were not fulfilled, the colliery proprietors were free from blame. There were two other conditions which would affect the Corporation materially. They related to the delivery of coal. The Corporation had been in the habit in past years of having coal sent in when they wanted it. Of course, they burned much less in June, July, and August than they did in December, January, and February. The colliery proprietors had laid down new terms; and the Corporation were now compelled to have 40 per cent. in the six summer months, and 60 per cent. in the six winter months. All the coal had to be received in equal instalments; so that they were taking as much from October to March as they were at other times in the winter. This, unfortunately, involved stacking; and they could not stack coal without deterioration. He put it at the lowest figure when he said that this would make a difference of £3000 in addition to the extra cost of coal. Every cloud, however, had a silver lining; and he could see that in the future the present troubles would result in great improvements being made in the manufacture of gas.

Mr. Edwards seconded the motion.

Mr. Bruce, referring to the quality of the gas, said he knew instances where the poorness of the light was caused by the meter, and not by the burners. There was insufficient pressure.

Mr. Chaplin said it seemed inevitable that the suggested increase in price should be adopted; but he would like to ask if the time had not arrived when the Corporation should consider whether they could not, with the assistance of other Corporations, have one or more collieries of their own. If they were to be subject to a merciless ring, who were extorting £1000 per week more from the Corporation than they did two years ago for the same quantity of coal, it seemed to him quite time that they ought to consider if there were not other ways of getting over the difficulty.

Mr. Mann said it was not always the burners that were at fault when the full light was not obtainable. In the case of some new houses, within his knowledge the light was bad, although the burners were new.

Alderman Coleman remarked that no amount of new burners would give them the illuminating power, if the Committee did not send it out. Their gas used to be 17-candle power; but he understood that it was now 2 candles less.

Mr. Hincks said he understood that the promise of the Gas Committee was that they would contribute a sum of not less than £10,000 to the rates this year. They were told that this sum would be exceeded, and also that the 2d. increase would produce about £13,000; so that this 2d. was put on in order that the consumers of gas should contribute to the rates just about the sum promised in the estimates.

Alderman Lennard, replying first to the last speaker, said the figures he mentioned were of necessity approximate. The Committee could not tell quite what they would get for coke and other residuals, nor whether their increased consumption would go on or not. They had tried to equitably, and almost equally, divide the loss between the ratepayer and the consumer, which he thought was the fair thing to do. They felt absolutely certain that this advance was only a temporary one; but it was far better to have a 2d. increase for two years than a 4d. one for a year. With regard to the illuminating power of the gas, he might say they were sending it out of such power that, if properly burnt, the consumers would get better gas than ever they had had in the past. The reason why the gas in new houses was so often unsatisfactory was because of the inadequacy of the pipes, which it should be remembered were not put in by the Corporation. He wished it were possible for builders to have to obtain a certificate of efficiency for their pipes before the gas was turned on. Mr. Chaplin's suggestion was not a new one, and it was not the first time the idea had been mentioned in the Council Chamber. Undoubtedly, if anything like the present condition of things existed for long, they would have to take steps to protect themselves. He did not think they ought to go about it in the manner some had suggested, by putting an export duty upon coal; but there were other ways and means of circumventing the colliery proprietors. He had had interviews with the managers of the largest gas-works in neighbouring towns, and they had their ideas and their plans; but it would not be wise to say what they were. In view of the fact that the Admiralty, the steamship companies, and the gas companies took half the coal that was produced, it would seem easy to protect themselves. It might be taken for granted that the Committee were not losing sight of what they might or ought to do in this matter.

The report was adopted.

LANCASTER CORPORATION GAS, ELECTRICITY, AND WATER SUPPLY.

At the Meeting of the Lancaster Town Council last Wednesday, the annual report of the Gas Engineer (Mr. Charles Armitage) was brought forward. It showed that the revenue in the twelve months ending the 25th of March was £27,021, and the expenditure £18,632; leaving a gross profit of £8389. This was disposed of as follows: Interest, £3883; sinking fund, £1608; income-tax, £289; borough fund, £1250; reserve fund, £1359. The last-named fund now amounts to £13,359. The working statement showed that the total quantity of gas sold in the year was 153,871,462 cubic feet; being an increase of 4,718,129 cubic feet, or 3·16 per cent., on the previous twelve months. The average cost of coal and cannel was 12s. 5·68d. per ton; but coke contributed in return 5s. 7 90d., and tar and ammoniacal liquor products 4s. 8·87d.; making a return for residuals of 10s. 4·77d., or 83·36 per cent. of the cost of coal. The Gas Committee reported that they had resolved to recommend the Council to advance the price of gas to all consumers by ordinary meters, from the date of recording the meter indexes for the June quarter, and also for the public lamps, by 3d. per 1000 cubic feet. The Electricity Committee reported a net profit of £420, to be transferred to the district fund account. The expenditure amounted in 1899 to £1682 19s. 7d., or 1·92d. per unit, and in 1900 to £2318 1s. 6d., or 1·97d. per unit; the income for the former year being £4007 4s. 3d., as compared with £4503 17s. 5d. in the latter. The Water Committee stated that the Borough Accountant had submitted an abstract of the accounts of the Water Department, with his report thereon, for the past year, and that it showed a net profit of £3288 to be transferred to the borough fund account; being £2046 less than before.

In moving the confirmation of the Gas Committee's minutes, Mr. Helme explained that the rise in the price of gas had been necessitated by the enhanced cost of coal. They would require, if they were to contribute at all to the rates—and they undertook at the beginning of the financial year to hand over £1000—that the price of gas within the borough should be raised from 2s. 6d. to 2s. 9d., or 3d. per 1000 cubic feet on ordinary meter supplies and for public lighting. The Committee proposed to continue the price charged at present for prepayment meters. They were supplying 27 cubic feet for 1d., which was about 3s. 1d. per 1000 feet; and seeing that these meters were in the houses of the poorest class of consumers, they asked the Council to allow them to receive the same quantity in the future as now. They had 1230 prepayment meters fixed; and he was glad to say that the consumption of gas had been steadily going up from the check experienced some time ago, and had reached 153 millions—an increase of 4,718,129 cubic feet on the year, or 3·16 per cent. In face of the increased competition with the electric light, he thought the Corporation were to be congratulated on the fact that the Gas Department, owing to the continual development of the use of gas for cooking, heating, and so on, was clearly growing; and they anticipated the success of the past would be maintained in the future, under the careful oversight of Mr. Armitage, to whom the credit was due. The minutes were confirmed, as were those of the Electricity and Water Committees.

COLNE CORPORATION GAS SUPPLY.

The Past Year's Working.

The Chairman of the Gas Committee of the Colne Corporation (Mr. Hartley) has prepared his report on the working of the gas undertaking last year. We learn therefrom that in that period 11,487 tons of coal were carbonized; the yield per ton averaging 11,110 cubic feet, or 94 feet below the previous year. The total quantity of gas manufactured was 127,631,000 cubic feet—an increase of 8,581,000 cubic feet, or 7·20 per cent. The total quantity of gas accounted for was 123,187,000 cubic feet; showing a leakage of 4,444,000 cubic feet, or 3·48 per cent., against 5·45 per cent. The quantity of gas used on the works was 1,339,000 cubic feet, as compared with 1,357,000 cubic feet in 1898-9, and 2,300,000 cubic feet in 1897-8. The number of meters now in use in the district is 5362, of which 1795 are prepayment meters. The increase in the former for the twelve months was 202, and in the latter 329. Cookers increased by 355; the number out on hire at the close of the year being 1130. There were 7,454,000 cubic feet of gas burnt in the public lamps, against 7,801,000 cubic feet in 1898-9. The length of mains in the district now reaches 37 miles; about 1500 yards having been laid during the year. The capital expended during the twelve months amounted to £2979. The principal items included new meters, cookers, boilers, mains, and services. The total outlay on capital account is now £101,288, of which £13,969 has been repaid. The gross expenditure for the year amounted to £18,107, against £16,727. The income from all sources, exclusive of the cost of street lighting, was £21,625, against £19,629; showing a net profit of £3518, as against £2902 the previous year, or an increase of £616. Last year the price of gas was reduced 3d. per 1000 cubic feet all round; the charges now being 2s. 9d., less 5 per cent., for ordinary meters, and 3s. 1d. net for slot meters. The loss to the revenue caused by this reduction amounted to £1238. The profit therefore exceeded that of the previous year by £1854. This was accounted for as follows: The gas saved through leakage amounted to a net gain of £330; extra sales from gas brought in £670 profit; residuals, through advanced prices, gave an increase of £1200; the rents from meters and stoves, £100 more; wages in the coke yard were reduced £100; purification, £70; and maintenance of works, £150. On the other hand, there was an increased expenditure as follows: Gas mains, £260; stokers', lamplighters', and fitters' wages, £115; salaries, £60; loans, &c., £100; and sulphate plant, £130. Residuals reached the following advanced prices over the previous year: Coke, 3s. per ton; sulphate of ammonia, £1 8s. per ton; and tar, 10s. per ton. The account for street lighting amounted to £1136, against £1219 in 1898-9, and £1551 in 1896-7. The number of lamps is now in excess of the latter year. The reduction in the account is owing to the fact that all wages, repairs, and gas consumed are now charged at cost price.

COCKERMOUTH GAS SUPPLY.

The Increased Cost of Coal—Price of Gas Unchanged.

At the last Meeting of the Cockermouth District Council, the Gas Committee called attention to the serious rise in the price of coal; last year's figure being 11s. per ton, whereas that for the present year is 16s. 6d.—a rise of 50 per cent. It was estimated that there would be an increase of something like £375 in the cost of coal. Coupled with this, was the fact that it was proposed to spend £250 out of revenue on additions to plant and improvements to the works. The Committee pointed out that the working balance, which stood at £1738 on March 31, would, in all probability, be reduced to £1200 on the corresponding day next year. After carefully considering the position, they recommended that no increase in the price of gas should be made now. If, however, present

prices for coals were maintained next year, the question would have to receive the serious attention of the Council. With regard to the salary of the Manager (Mr. Harold Baker), if circumstances had permitted, the Committee were prepared to give the matter favourable consideration. He, however, voluntarily withdrew his application, on account of the great increase in the price of coals. Mr. Stephenson, in moving the adoption of the report, said, with reference to the coal contract, he had looked up the prices paid during the last eleven years, and found them to average 10s. 7d. per ton—the highest being 12s., and the lowest 9s. Now they were paying 16s. 6d. With coal at 11s. per ton, they could sell gas at 3s. 3d. per 1000 cubic feet and make a profit; but it was obvious that, if they had to pay 16s. 6d., the conditions under which they had to work were vastly different. They hoped that the present high prices would not be maintained; but if they were, the Council might rest assured that the Committee were keenly alive to the imperative necessity of the gas undertaking paying its way. They proposed this year, under what he thought would be admitted were exceptional circumstances, to utilize a certain portion of the accrued balance; and he hoped that no objection would be taken to it. After all, this balance came out of the pockets of the gas consumers; and he thought that, under the circumstances, there could not be any very serious objection to a portion of it being applied for the benefit of those from whom it was derived. Another thing they ought to take into consideration was that they were spending, and had spent, a considerable sum on the extension and improvement of the works, which, properly speaking, was capital expenditure; but they had paid it out of revenue. Mr. Jackson seconded the motion, and expressed a hope that when they met this time next year coal would be at a different price. The Council, he said, ought not to forget that since the gas-works were purchased by them they had been put into a state of thorough repair, a considerable portion of the debt had been paid off, and there was a balance in hand—showing that they had been worked at a profit since the Council had been possessors; and the charge had been very considerably reduced. He hoped the Council would agree with the suggestion that, for this year, at all events, it was not desirable to raise the price of gas. The report was adopted.

THE GAINSBOROUGH GAS-WORKS TRANSFER.

At an Extraordinary Meeting of the Gainsborough Urban District Council held yesterday week, the question of the purchase of the gas-works was discussed, and the following resolution was agreed to: "That the Gas Committee be authorized to carry on the gas undertaking jointly with the Gas Company's Directors and officials, and make such financial arrangements for the purpose as they may think proper from the 1st of July, 1900, until the payment of the purchase money, when the transfer will be completed. The terms of carrying on the undertaking are set out in a memorandum dated the 21st of May, 1900, and signed by Councillor Cooper, on behalf of the Council, and Mr. R. W. Forrest, on behalf of the Gas Company, and that the same is hereby confirmed." The terms of settlement as read were: The price of the undertaking to be £75,000. The Council to pay in addition £5000, the amount of debentures, and £2000 as compensation to the Secretary for loss of office. The Company to pay all debts and receive all moneys owing on June 30, and the Council to receive all moneys, rents, &c., owing on or after July 1. The Company to manage the undertaking on behalf of the Council from and after June 10, and the Council to pay the maximum statutory dividend up to the date when the purchase money is paid over, and also to pay the Directors' fees, Secretary's salary, and all the working expenses of the undertaking, together with the debenture interest. A resolution in accordance with the terms of settlement was adopted, and it was decided to give three months' notice to the debenture holders to pay off the mortgage of £5000 on or before Sept. 30.

HONLEY GAS-WORKS PURCHASE.

The Ratepayers' Consent—Financial Position of the Company.

A Public Meeting was held at Honley last Friday week for the purpose of taking the opinion of the ratepayers on the question of the purchase of the gas-works, at present owned by a limited Company. The Clerk to the District Council (Mr. James Sykes) read a statement of what had taken place in the Council with reference to the suggestion, from which it appeared that the question came forward in consequence of a ratepayers' memorial, in November last, asking the Council to take into consideration the provision of a public electric supply. The Gas Company had been approached, and had consented to hand over their works, &c., subject to all liabilities, as from the 31st of December last, for £18,500, with interest at the rate of 4 per cent. per annum, and the payment of all costs by the Council. The present share capital was £8000, fully paid up, with £500 owing on a loan of £2000 borrowed in 1886, and a reserve fund of £587. A new gasholder, erected last year, had doubled the storage capacity. The Directors had practically asked that they be paid at the rate of £2 per share for ordinary shares, and £500 for the reserve fund. The receipts last year were £2398, exclusive of the amount paid for public lighting; and the average receipts from 1891 to 1899 had been £2154. The amount expended in repairs had varied from £99 in 1891 to £912 last year, or an average of £327. The wages bill reached under £300 per year. For the last nine years, the average profits had been £720; and to this it would be fair to add the sum of £1200 in respect of expenditure incurred on capital account, which would bring the average profits to approximately £850. The liabilities owing were only on tradesmen's accounts. The profits for the last three years had been £966 in 1897, £907 in 1898, and £212 in 1899; but during the latter year £911 had been expended on a new holder. The Company had been able to pay a dividend of 7½ per cent. during late years, together with £70 in respect of the loan. They were empowered to pay 10 per cent., and charge 4s. 4d. per 1000 cubic feet, instead of 3s. 9d. Assuming that it would be necessary to borrow £19,000, repayable by way of annuity, with interest at 3¼ per cent. per annum, at thirty years' purchase, the yearly payments would be £966. A Sub-Committee of the Council who had reported on the question were of opinion that the money could be borrowed and repaid in thirty years, without the necessity of a rate-in-aid, as a penny rate would realize £60 per year. The Sub-Committee were of opinion that the works had been conducted with a view not to disposing of them, but making them a paying concern, and recommended that the Council should purchase the works providing an expert held a similar opinion after making a thorough examination of the works, books, &c. Accordingly, Mr. E. A. Harman, the Engineer of the Huddersfield Corporation Gas Department, was engaged, and had recommended the Council to acquire the works. There was some discussion; and a resolution consenting to the purchase of the works on the terms offered was passed by 32 votes to 24.

FATAL ACCIDENT AT THE WANDSWORTH AND PUTNEY GAS-WORKS.

A deplorable accident, by which two men instantaneously lost their lives, occurred on Monday last week at the Wandsworth and Putney Gas-Works. The names of the unfortunate men were William Davidson and Frederick Smith; and their ages were respectively 45 and 27 years. It appears that they were engaged in connection with the construction of a new gasholder tank, for which Messrs. Perry and Co., of Bow, are the Contractors. At the time of the accident, they were working in the bottom of the tank; and as a skipful of clay was being lifted by a crane, the wire rope broke, and the skip and its contents fell upon, and instantly killed, the two men below. The skip was only between 10 and 12 feet from the bottom of the tank when the rope parted. It is curious that both on the Tuesday and Saturday previous to the accident, all the ropes on the four cranes engaged on the work were examined and tested. The inquest on the bodies was held last Thursday, by Mr. Braxton Hicks, at the Wandsworth Town Hall. The facts already mentioned were brought out in the evidence. In addition, it was elicited that the rope was purchased from Messrs. Wilkins and Co., of Wapping, in June, 1896; but it had only been used during two-and-a-half years of that period. The maker of the rope examined it in Court, and stated that, when it was supplied, it would stand a strain of 14 tons weight, and that at the time of the accident it had only about 15 cwt. to lift. Notwithstanding this evidence, and the summing up of the Coroner (which conveyed the impression that he regarded the affair as an accident pure and simple), the Jury returned a verdict of death by accident, caused by using an old and defective rope; adding their opinion that, before it was used, it should have been examined by a thoroughly competent person. It should be mentioned that the Gas Company were in no way concerned or involved in the accident, and, in fact, were not referred to in the proceedings at the inquest.

THE INTRODUCTION OF GAS INTO PAISLEY.

A correspondent writes: The adoption of the electric light in Paisley recalls the introduction of gas, and the method by which it was taken under municipal control. The first movement made in Paisley regarding the use of gas was in 1819, when Mr. James Wilkinson, china merchant, High Street, and others, applied to the Town Council for permission to convey gas by pipes across the street opposite their premises. The Council willingly gave their consent, and expressed their readiness to afford every facility and encouragement to any measure of the kind. It was in September, 1821, that the first steps were taken for the establishment of a Company in Paisley to make gas. The promoters applied to the Town Council to take shares; but they declined to do so with expressions of regret, alleging that the state of the community's funds did not justify them in taking such a step. They, however, expressed the hope that the undertaking would be beneficial to the public and profitable to the promoters. Sufficient funds having been obtained, the promoters applied to Parliament for an Act for the better lighting of the town. A part of the preamble of the Bill ran as follows: "And whereas inflammable air or gas, coke, oil, tar, pitch, asphaltum, ammoniacal liquor, essential oil, pyroligneous acid, char coal, and other products, may be procured from coal, oil, tallow, peat, turf, rosin, wood, and other inflammable substances; and whereas the inflammable air may be safely and beneficially used for lighting the streets," private houses, &c., "and the coke may be beneficially employed as fuel," and the oil, tar, and other inflammable substances already mentioned, "may be used and applied in various other ways with great advantage," &c. The Act was obtained, and the Paisley Gaslight Company so incorporated was authorized to raise £16,000 in shares of £5 each, and to borrow a further sum of £4000. The Bill received the Royal Assent on May 30, 1823. Operations were commenced without any loss of time; and the Directors applied to the Town Council on the 23rd of August in that year for permission to open some of the streets for laying pipes. In the following year, the greater number of the inhabitants were enjoying all the comforts to be derived from this greatly superior mode of supplying light. In 1832, the Company obtained authority to raise additional capital to the amount of £16,000, in shares of £5 each, with power also to borrow £8000. This money was required for the further extension of the works to meet the increasing demand for gas. At the latter end of 1843, a new Gas Company was formed; and on Jan. 29, 1844, "interim" Directors applied to the Town Council for their consent to operations being carried on in the meantime without an Act of Parliament, and to allowing pipes to be laid in the streets. The Directors of the old Company, hearing of this application, desired the Council to give them an opportunity of stating their objections before coming to any decision. This meeting took place, and the Council afterwards appointed a Committee to confer with the Directors of the old Company on the subject of ceding their whole works to the Council for the behoof of the public, which it had been announced that they were willing to do on terms advantageous to the community. After some correspondence and meetings, heads of an agreement for merging the Paisley Gaslight Company into a public interest in connection with the Corporation were agreed to and signed by both parties. These were to the effect that a Trust should be constituted with a view to secure cheap lighting for the town, that the £5 shares of the Company should be valued at £8, which was the market price at that time, and that the shareholders should receive 4 per cent.

thereon; also that the Board of Management should consist of twelve Trustees, eight of whom should be elected by the shareholders and four by the Council. When one-fourth of the capital should be paid up, the Council should elect five; and when one-half was paid, the Council would elect six Trustees—this system to be continued to the end of the Trust. The Council were also to have power to terminate the Trust by paying the shareholders; and they were entitled to borrow money for the purpose on the security of the works. This arrangement was only to be carried into effect in the event of the new Company not obtaining their Act of Parliament. The subject of this agreement and the prosecution of the new Gas Bill involved many public meetings, and caused much excitement in the town. The new Bill passed the Committee of the House of Commons; but while pending in the House of Lords, an arrangement was made whereby, on payment of £3600 by the old to the new Company towards defraying expenses, it was agreed to except Paisley from the parliamentary limits of the Bill. This was sanctioned by Parliament. Afterwards parliamentary notices were published and a Bill was prepared to carry out the agreement between the Town Council and the old Company. This Bill, establishing the gas-works as a public Trust, passed through both Houses without opposition, and received the Royal Assent on June 30, 1845, just 55 years ago. The price of gas in Paisley in 1844 was 7s. per 1000 cubic feet—the cheapest gas in Scotland at that time.

ELECTRIC LIGHTING NOTES.

The Leamington Town Council last Friday agreed to make an offer for the purchase of the undertaking of the Midland Electric Light Company for the sum of £17,000, without prejudice.

The Bradford Electricity Committee have resolved to apply to the Local Government Board for sanction to borrow a further sum of £140,000 for the erection of a new electricity generating station at Valley Road, for additions to existing stations, and for further machinery and plant.

In the course of the annual statement of the Chairman of the Finance Committee at the meeting of the Ashton-under-Lyne Corporation last Wednesday, it transpired that there was a deficiency on the electricity revenue account for the year of £1060; and the total deficit from the commencement of the works was £2074.

On behalf of the Local Government Board, Colonel A. J. Hepper held an inquiry last Thursday at Southport into an application by the Corporation to borrow £13,000 for the provision of a destructor at Crowlands, and £9200 for electric lighting purposes. Respecting the electricity loan, it was stated that the Corporation had already spent or committed themselves to spend £138,500; and they desired extra money to meet possible demands.

During the past few weeks there has been an average of 63 fires in London every seven days; and, according to the "Daily Express," many of them have been caused by faulty electric light installations. Several occurred in shop windows, where the hanging incandescent lamps were allowed to touch lace or other more or less gauzy materials with which the window was draped. Our new daily contemporary relates the story of a youth who last winter, during the prevalence of very cold weather, went to sleep with an incandescent lamp wrapped in a handkerchief at his feet. An hour afterwards he was aroused by a burning sensation at his toes, and found the bed-clothes smouldering.

At the last meeting of the Eccles Town Council, Alderman Mellor reviewed at considerable length the accounts of the electric light undertaking for the past year. They showed a deficit of £789; but of this sum, £346 was for the repayment of loans. He estimated the loss on the current year's working at upwards of £800. Alderman Kendall said he regarded the figures as very satisfactory, considering the difficulties the Council had to contend against. Alderman Spary suggested that the Electric Lighting Committee should face the matter, and ascertain whether they could be supplied in bulk with electricity cheaper than the Committee could generate it. Mr. Nuttal pointed out that the amount overspent, and due to the Treasurer, on electric lighting account was £7289. He moved that steps be taken by the Council to obtain borrowing powers to cover this amount. The motion was agreed to unanimously; and the accounts were adopted.

The application of the Devonport Corporation for a loan of £69,727 for the purposes of the electricity undertakings was the subject of an inquiry yesterday week by Colonel Luard, one of the Local Government Board Inspectors. The works are for the supply of current for the working of tramways as well as lighting; and it was stated by Mr. C. Furness, the Electrical Engineer to the Corporation, that they would start with an assured demand of 700,000 units per annum for traction. Particulars have already been given in the "JOURNAL" of the proposed public lighting arrangements, which are to comprise 41 arc-lamps in the main thoroughfares; the intention being to light the other streets with incandescent gas-burners. Of the entire loan, £15,000 is to be spent on the site for the central station; and the Inspector expressed some surprise on learning that this is to be in Stonehouse, and not in Plymouth. A ratepayer opposed the application, on the ground that the Corporation could have obtained land in Devonport.

At last week's meeting of the Driffield Urban District Council, a letter was read from the Northern Counties Electricity Supply Company, giving the Council notice that it was the Company's intention to apply to the Board of Trade in the next session of Parliament for a Provisional Order for the lighting of Driffield by electricity. The letter asked for an appointment with the Council, in order that the representatives of the Company might discuss the Company's proposals for the establishment of electricity works in Driffield. Mr. C. Smith said that the Council having recently, at a very great cost, purchased the gas-works, would never allow a second lighting power to gain a footing in the district. If it was found there was any demand for electricity, the Council would supply it. He moved—"That the Clerk write to the Company named, that this Council does not see any necessity for having an interview with the Company's representatives, as this Council will not consent to the grant of a Provisional Order." This was carried unanimously.

A glowing statement of the success of the Torquay electric light undertaking was made at a Local Government Board inquiry last Tuesday. The Town Clerk said the plant was laid down in 1897. On March 31, 1898, there were 55 consumers, and 4688 8-candle power lamps were in use. On March 31 last the number of consumers was 221, and of lamps 10,070. The income, which in the first year was £2839, was in the second £3699; and the working, which resulted in a loss of £138 on the first year, produced in the second a profit of £67. The Corporation now want to borrow £15,000 for the extension of the plant, which is to be practically doubled, while the cables are to be extended in several directions. At present the plant is being worked to its full capacity. Colonel Luard, the Inspector, suggested that the Corporation might be able to lower the charge of 7d. per unit for the first hour, as they were now working the undertaking at a profit. The Town Clerk said the success of the works had exceeded their most sanguine expectations, but they would have to wait some time before reducing prices.

The original electric lighting scheme of the Lowestoft Corporation only provided for a connection of about 6000 lights; and so far applications have been received for about 5000. The decision to increase the public lighting by electricity, and a hope that the private business will extend, have induced the General Purposes Committee to recommend the borrowing of an additional £20,000 for increasing the capacity of the electricity plant. The matter was discussed at the meeting of the Council yesterday week, when some of the members at first seemed inclined to hesitate in venturing more on this enterprise at the present time. The Committee, however, have determined that every little increment of business they can control shall be brought to the aid of the new department. Among their recommendations was one that the Town Hall should be lighted by electricity, another that electric motive power should supersede the gas-engines now in use on the pumping-stations, and a third that all the public clocks should be lighted by electricity. It is the last straw that breaks the camel's back; and it is just possible that the final recommendation turned the scale in favour of the expenditure of the extra £20,000 on further electrical plant.

The Electric Lighting Committee had the humiliation of appearing before the Coventry City Council at their last meeting with a report which showed a greater loss than in the previous year—that is to say, £1745 has to be charged against the rates, compared with £1619. There has been an increase of business; but this appears to have been gained by an alteration in the scale of rebates which the outcome of the year's working has not justified. The number of consumers increased during the year from 135 to 226; and the lamps connected from 10,699 (8-candle power) to 17,806. The number of units sold advanced from 149,547 to 229,607; and the revenue from the sale of current and meter-rental from £3597 to £4189. The previous year's report, it should be mentioned, covered a period of fifteen months; and during the year which has just expired, electric street lighting has been inaugurated. If the comparison is confined to private lighting only, and the figures taken for the periods of twelve months ending March 31, 1900 and 1899 respectively, the Committee state that the units sold have been 166,057 against 110,106, and the revenue from the sale of current £3500, against £2640. The increase in receipts has not been proportionately so great as the increase in sales, owing, as already remarked, to the alteration in the scale of rebates, which came into effect at the commencement of the year. The profit on working is £785, against £333 for the previous fifteen months; and the net charge on the rates is £1745, compared with £1619 in the preceding year.

The Electrical Engineer to the Colne Corporation (Mr. F. Thorpe) recently submitted to the Electrical Committee detailed estimates of electrical plant to the amount of £28,708 for the town. Provision was made therein for supplying the full amount of current required by the proposed light railway, and also for 12,000 8-candle lamps for inside lighting and a small amount of street lighting. The plant will be put down from time to time to meet the demands of the district. The Committee resolved that the plans and estimates be approved, and that application be made to the Local Government Board to sanction a loan of £39,019 for carrying out the works. The matter came before the Town Council at their last meeting, when Mr. Hewitt, in moving the adoption of the minutes, remarked that they represented the deliberations of the Committee during the past nine months. The Council were asked to sanction an application to the Local Government Board to borrow a sum of almost £40,000. One sentence in the minutes, he thought, practically explained the position of the Committee, and it was the one which set forth that the plant for which they were asking borrowing powers would be put down from time to time to meet the demands of the district. The object which the Electrical Engineer, who was, of course, responsible for the scheme, and the Borough Surveyor, who had been assisting him, had in view, as well as the Committee, was to have a scheme which would readily lend itself to the future development of the town. It was hoped that the consent of the Local Government Board would soon be obtained, so that the Corporation could get the electric lighting system into operation; and as soon as the tramways made a move, the Council would meet that demand in due course. Mr. Riley having seconded the motion, it was postponed until after the Council had inspected the plans in Committee, at the conclusion of their ordinary meeting, when the minutes were confirmed.

Mr. C. F. Botley, the Assistant Gas Engineer and Electrician to the Hastings Corporation, is not relaxing his criticism of the recent decision of the Town Council, alluded to last week, to light a number of streets by electricity. In a letter to a local paper, he combats the statement that the town is likely to experience a saving by supplanting the incandescent gas-light, which, he points out, is now being used for public lighting in all the chief towns. As to the alleged success of electric lighting, he questions whether it has achieved it at Brighton, which is often cited as an example. "How," he asks, "is the so-called profit obtained? And if there is a profit, why is the general district rate not reduced by the amount of such profit?" The reason, he says, is not far to seek. "A careful examination of the figures will show that the ratepayers are such good custodians of the electric light works there that it is but a play on words to say there is profit when, perhaps, £2000 is returned to the rates after some £6000 is taken from them." He gives the following figures to assist his explanation: In 1892, Brighton's public lighting cost £9095, and the general district rate was 2s. 10d. In 1898 the lighting cost £11,937, and the rate was 3s. 3d. He admits that the illumination of the main streets is superior to what it was, and he also agrees that the additional cost of public lighting does not probably account for all the increased rate. The point is that without the additional cost of public electric lighting which the ratepayers have to pay as compared with previous illumination, there would not be any so-called "profit" at Brighton. "Electricity," then proceeds Mr. Botley, "cannot possibly be

produced locally at 1¼d. per unit. The cost of fuel is the principal factor. Coal costing 9s. or 10s. per ton at Leeds would cost three times as much at Hastings. Therefore, as the charges are based on the figure of 1¼d. per unit, from whence is to come the inevitable balance of cost of current for the new lamps as compared with the estimated cost?"

An application by the Pemberton Urban District Council to the Local Government Board for power to borrow £20,000 for electric lighting purposes was the subject of an inquiry by Mr. F. H. Tulloch, M.Inst.C.E., a few days ago. Mr. T. R. Ellis, who represented the Council, said the township had for some years been supplied with gas by the Wigan Corporation—the streets and some of the houses being lighted by gas; but there were a considerable number of houses in which the illuminant was oil. It had been felt for some time that it was very desirable that provision should be made for supplying light to the township; the arrangement with Wigan not being altogether satisfactory. Mr. Salter, the Electrical Engineer consulted by the Council, gave details of the scheme, which he said provided for 5000 lamps of 16-candle power. The dynamos could be utilized either for lighting or traction, and would give 460 volts for lighting purposes, and from 500 to 550 volts for traction. It would be the three-wire system. There would be two 16-candle power lamps where each lamp-post now stood, and the street lighting cables would be separate from the domestic supply. There would be an average of five lamps in each house, which would make about 1200 or 1300 lights for the 251 houses. They intended to charge the consumers 5d. per unit, which was equivalent to the cost of gas. The application met with some opposition; one speaker remarking on the fact that although 1400 papers had been sent out, only 251 had been returned in favour of the scheme. He thought the project would add to the rates. The Inspector remarked that 251 householders had agreed to take the electric light, and the question was, how many of the dwellings were cottages. The Clerk (Mr. Partington) said, strictly speaking, none of them. He might say the number of houses in that particular area was 1700, 1200 of which were under and 500 over £10 rateable value. The majority of the houses were cottages. The lowest rateable value was, he thought, £8. A speaker pointed out that the bulk of the occupants of these cottages burnt oil. Mr. Ellis admitted that this was the case; and he said that one of the objects of the Council was to get rid of the system of oil lighting, because it was dangerous. After further observations, the inquiry closed.

A special meeting of the Lowestoft Town Council was held on Monday evening last week to receive a report of a Sub-Committee of the General Purposes Committee of the Corporation on the subject of the electric lighting of the town. The Sub-Committee had been on a roving commission, accompanied by Mr. F. Fairley, who is in partnership with Mr. W. C. C. Hawtayne, the Electrical Engineer to the Corporation; the places visited being Barking, Brighton, Dover, Harrow, and Hove. They produced a report which for bulk would have done for a place ten times the size of Lowestoft; the details in regard to each town being set out at extraordinary length. A local paper is unkind enough to suggest that the extent of the report is a sort of justification for the money of the ratepayers—about £50—spent in getting the particulars to produce it. However, the long and short of the matter is that the Local Government Board are to be asked for power to raise a further sum of £20,000 for electric lighting purposes. Mr. Jefferies, in moving the adoption of the report, said the borrowing of an extra £20,000 might be considered a very momentous matter to some, and he himself would have been of the same opinion had he not visited the various towns set forth in the report. But it was rendered necessary by the extensions which must be made owing to the increased number of applications for the light. They must go in for it thoroughly and well. They hoped later on, when the electric trams came, to have a day-load. In the discussion, the inevitable reference was made to the cost of the electric light as compared with gas; and Mr. Hawtayne gave, on the authority of Mr. Preece, 2s. 6d. per 1000 cubic feet as equivalent to 5d. per unit. But if Sir W. H. Preece was right when he said 8 units of electricity are equal to 1000 cubic feet of gas, the 5d. per unit works out to gas at 3s. 4d., as compared with 4s. 6d. now charged at Lowestoft. This is for gas consumed in the ordinary way. With the Welsbach burner, gas at 5s. per 1000 feet would be equal to electricity at 1d. per unit. However, the ratepayers are determined to have the electric light, and they will soon be able to ascertain whether or not it is cheaper and better than gas consumed with up-to-date appliances. But if they expect to save to the extent which the supporters of the scheme make out, we hope they may not be doomed to disappointment.

There has been an investigation by a Sub-Committee of the Electric Lighting Committee of the Hanley Corporation in regard to the deficiency on the working of the department during the past year; and the result appears to be a condemnation of the policy pursued by the Committee in the conduct of the business. In the course of the inquiry, the Sub-Committee had before them reports by the Borough Engineer and Electrical Engineer. In the former, it was stated that the loans now sanctioned by the Local Government Board in respect of the electric lighting undertaking were £70,009; and the amount borrowed was £64,990. Application had been made for further borrowing powers to the extent of £4000. During last year the expenditure on capital account was £7044; bringing the total expenditure up to £67,829. The capital outlay amounted to £55 per kilowatt of generating capacity, and out of sixty-six other local authorities with electricity undertakings, there were only three where the cost was lower, while out of forty companies there was only one having a lower capital cost. There was, therefore, in the Borough Engineer's opinion, no cause for apprehension as to the future financial success of the undertaking. The total capacity of the works was 1224 kilowatts, and the maximum demand last year was 550 kilowatts; so that the capacity was amply sufficient for many more customers as well as for reserve in case of necessity. The expenditure on revenue account last year was £7632; and the receipts amounted to £8809—leaving a gross profit of £1177. The interest and sinking fund charges amounted to £3446; and as the gross profit was insufficient to meet those charges, the sum of £2269 had to be transferred from the general district fund account. In 1894-6, the gross profits covered the interest and sinking fund charges, and nothing was taken from the rates; but the amount drawn from the rates in 1897 was £188, and in 1898 £377—making the total loss for the last three years £2834. The deficiencies began with the reduction in the charge per unit, but for which the revenue would have been greater by a total of £3600; so that, the Borough Engineer believes, there would have been a balance in hand, notwithstanding the increased price for fuel, interest, and sinking fund. This fund now amounted to £5638, and might be regarded as a valuable asset to its fullest extent. The Electrical Engineer in his report went into details of the year's working, showing the extra cost incurred in fuel, &c., and pointing out defects which should be remedied, and savings which might be effected. The Sub-Committee reported that, after full consideration, they were of opinion that the deficiency in the revenue account for last year was to be attributed to the following causes: (1) Too early reduction in the price of current before a reserve fund had been formed; (2) increased cost of fuel, wages, and materials; (3) abnormal repairs to generating plant; (4) increased charges to sinking fund and interest on further capital. They decided to recommend the Council to increase the present prices for the supply of electricity of 5d. and 2½d. to 6d. and 3d. per unit from July 1, less discount as before. In addition, the Electric Lighting Committee recommended that the charge for electrical energy to places of worship be increased from 4d. to 4½d. per unit, and for heating and power supplied through separate meters from 2½d. to 3d. per unit up to four hours' consumption per day, and 1d. per unit afterwards.

SHEFFIELD CORPORATION WATER SUPPLY.

A Satisfactory Year's Working.

The General Manager of the Water Department of the Sheffield Corporation (Mr. W. Terrey) has lately presented to the Water Committee the report and statement of accounts for the year ending March 25 last. They show a surplus of £17,037 on the twelve months' working. The capital expenditure on the existing works up to March 25, 1899, was £2,275,346; and the outlay during the past year—£11,941—brought this sum up to £2,287,287. On the Little Don Valley works, £95,699 was spent last year; bringing up the total to £284,087, and making the total capital expenditure to the close of the past financial year £2,751,374. The total income derived from water-rates for domestic and trade purposes during the year amounted to £125,106, against £118,093 in the year 1898-9; showing an increase of £3916 from water used for domestic purposes, and £3097 from that supplied for trade purposes by meter—a total increase of £7013, or 5·93 per cent. The receipts from meter-rents, house, land, and mill rents, and plumbing work (less *per contra* items) amounted to £6108; making the total income from all sources £131,214—being an increase of £7333 over the previous year. The net expenses of maintenance and management came to £26,443. The net revenue was £104,771, on which were the following charges: Annuities, £58,836; interest on Corporation stock and mortgages £21,022; Langsett works, £727—making a total of £80,585, and leaving a net profit of £24,186, against £20,295 before. The twelfth annual instalment set aside out of revenue for the redemption of annuities and the extinction of loan indebtedness amounted to £7149; leaving the surplus for the year £17,037, as already mentioned. The above result was achieved notwithstanding the reduction, from Dec. 25, 1897, of one-half the amount of the 25 per cent. added to the water-rates by the Sheffield Water Act, 1864. This obligation involved a reduction in the water revenue amounting to £25,279. It appears from the special account relating to the sinking fund that the appropriations to Dec. 31, 1899, with the earnings thereon, amounted to £87,599; adding the liability from Jan. 1 to March 25, 1900, £1827, makes the total amount provided from the revenue account to the 25th of March last £89,426. Mr. Terrey gives a table showing the progress which has taken place in the finances of the department since the transfer of the water-works to the Corporation in 1888. The net surplus on March 25, 1899, amounted to £33,658; adding the surplus on the past year's working, £17,037, brings up the total, after discharging all liabilities, including the sinking fund, to £50,695. The number of houses supplied with water is 86,296; being an increase of 3232 during the year. The number of water-closets now supplied is 15,063, and of baths 6402. There are 3485 water-meters in use, against 3380. The grand total of all supplies on the 25th of March last was 122,822, against 114,889 in the previous year.

THE PROPOSED PURCHASE OF THE FALMOUTH WATER-WORKS BY THE CORPORATION.

No Decision yet Arrived at.

Considerable difference of opinion still exists in the Falmouth Town Council with reference to the proper course of procedure in the matter of the purchase of the water-works. At a meeting of the Council yesterday week, the Mayor said the members were substantially agreed as to the desirability of having the question settled at the earliest possible moment by putting it before the ratepayers for their decision. It was, however, advisable that they should themselves be unanimous, or nearly so, as to the course to be pursued. With the information before them, many of them were not prepared to pledge themselves to compulsory purchase. If it could be shown by an engineer in whom they had implicit confidence that purchase would be desirable, that the cost would not be prohibitory, and that the prospect of success in Parliament was tolerably good, then some of those who had hitherto stood aloof would be inclined to throw in their lot with the advocater of compulsory purchase. His opinion was that the ratepayers should be placed in possession of fresh information by an engineer approaching the matter free from past controversies or previous ideas. Two resolutions were proposed—one pledging the Council to proceed with the purchase of the undertaking without taking further expert advice; and the other authorizing a Committee to engage another engineer to prepare a report for submission to the ratepayers. It was contended by the supporters of the second proposition that it would strengthen the case of the advocates of compulsory purchase if Mr. Silverthorne's conclusions were supported by another engineer. The reply was that the object of the mover of the amendment was to throw dust in the eyes of the ratepayers, and confuse the real issue. In the end, the amendment in favour of consulting another engineer was carried by 8 votes to 7. One of the members remarked that the attempt to make the Council unanimous would be futile.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

A very short meeting of the Edinburgh and Leith Gas Commission was held on Monday, at which almost the only business was the submission of the accounts of the Commission for the year ending May 15. They were introduced by Mr. J. S. Gibb, the Treasurer, with the remark that they would require to lie on the table for a month, to be certified by the Auditor, before they could be adopted, and that there was some more information which would be laid before the Finance Committee. Bailie Manclark, of Leith, the Convener of the Finance Committee, moved that the accounts be remitted to his Committee for consideration and report. He was glad to say that the Commissioners were some £10,000 better off than they were a year ago. There was a suggestion that they should give a little more for repayment of borrowed money; but the whole matter would be gone into before the Committee. The remit was agreed to.

A good deal of work affecting gas and water supplies in Scotland has been got through at Westminster this week. The Falkirk Corporation Bill, which provides for the extension of the burgh boundaries and the erection of new gas-works, passed the House of Commons Committee as an unopposed measure. The Edinburgh Corporation Bill has also been passed, though upon conditions, not yet adjusted, but which do not seem to be very onerous. The opposition to the measure was chiefly in regard to the proposal to take in the area at Granton upon which the new gas-works are being built. The county has been worsted, as the area is to be brought into the city. It was inevitable that this should take place by-and-bye, and probably the sooner the better. At the same time, it is impossible not to sympathize with the complaint of Sir J. Gibson Craig, the Convener of the County, to the effect that whenever an area in the neighbourhood of a city became valuable the city absorbed it, and the county lost the rates. Two other measures—the Falkirk and District Water Bill, and the East Stirlingshire Water Bill—have also both been passed by Parliamentary Committees. In neither case was the opposition serious. These Bills should have the effect of settling all questions of water supply over a wide district for a good few years to come.

The report of the Galashiels Gas Company shows that for the past year the revenue was £10,562 and the expenditure £8095, of which £648 was an allowance for depreciation. The profits amounted to £2467. The Directors recommend payment of a dividend at the rate of 10 per cent., which will leave a balance at credit of profit and loss account of £6198, as compared with £5831 a year ago. The Directors also recommend that the price of gas be raised from 3s. 4d. to 3s. 9d. per 1000 cubic feet.

The Kelso Gas Company have paid a dividend at the rate of 10 per cent., but have been obliged to raise the price of gas 5d. per 1000 cubic feet, making it now 3s. 11½d.

The Cupar Gas Company had an income last year of £3732, which was £64 more than in the preceding year. On the expenditure side, £300 more was required for coal, and £60 more for wages. New stock issued also raised the sum required to pay dividend on preference shares from £70 to £237. The dividend to ordinary shareholders has been reduced from 40s. to 30s. per £25 share. The price of gas is to be raised 5½d., making it 4s. 9½d. per 1000 cubic feet.

The Alexandria Gas Company, on account of having had to pay £700 more for coal last year, have resolved to raise the price of gas from 3s. 11d. to 4s. 5d. per 1000 cubic feet.

The Corporation of Campbeltown have decided to raise the price of gas from 4s. 2d. to 5s. per 1000 cubic feet. This step is necessary on account of an increase of £575 upon the coal contract for the current year.

The Directors of the Cambuslang Gas Company, after placing £300 to reserve fund, and paying a dividend at the rate of 8 per cent., carry forward £127. They are to borrow a sum of £2000 to meet the cost of extensions of the works. The price of gas has been raised 5d., making it now 3s. 9d. per 1000 cubic feet.

The statement is made to-day, as a sort of preliminary to the full disclosure, that the accounts of the Paisley Gas Corporation for the past year show a deficit of over £1000. This, it is understood, has been brought about by heavy losses on the Corporation electric lighting scheme. It is expected that the price of gas will be advanced by 3d. per 1000 cubic feet. A deficit is something new in the Paisley Corporation Gas Department. I confess that I would not have regretted although it had been a genuine deficit upon the working of the gas undertaking, because an opportunity would then have been given of seeing how those who plunder gas profits for municipal purposes, would act when there was need to add a sum to make the gas accounts square—whether, having aggrandized the rates at the expense of the gas consumer, they would relieve the gas consumer out of the rates. But, of course, considerations of this nature are put out of court, because the deficit arises upon the working of another enterprise, for which most reasonably minded people consider that the gas undertaking has been illegitimately compelled to stand in the capacity of parent. When this view is reached, it is seen that what has taken place in Paisley is nothing more than a casting forward of previous years' methods—a sort of perfecting of the arrangements for plundering the gas accounts. In former years, the Corporation were content to wait till the coffers of the Gas Department were overflowing before they put their hands into them. Now they are too impatient to wait till it be seen if there is to be anything to spare; they take the money day by day, as it comes in. This last state of the Corporation is indeed worse than the first.

The Aberdeen Corporation Gas Committee have this week resolved to recommend the Town Council to again charter a steamship for the conveyance of coal from southern ports for the gas-works, and to renew the arrangements for the discharge of the cargoes in the port of Aberdeen. The Gas Department saved considerably by the running of the vessel last winter.

Two announcements are made to day which are of interest. One is that it has been resolved to wind up the Edinburgh Literary Institute, an institution which owns a library, a reading room, and several halls for entertainments or public purposes. The reason given is that it is not paying. There is an increased expenditure, which the Directors cannot see their way to meet; and this increase is "almost entirely due to the fact that the electric light is more costly than gas." The Institute has

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 17.

Issue.	Share	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment	Issue.	Share	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.			£ s. d.	£			p. c.	GAS COMPANIES.			£ s. d.
590,000	10	Apl. 11	10½	Alliance & Dublin 10 p. c.	17½—18½	−2½	5 13 6	60,000	5	Feb. 23	7	Ottoman, Ltd. . . .	5—5½	..	6 7 3
100,000	10	,,	7½	Do. 7 p. c.	12½—13½	−1	5 11 1	500,000	100	June 1	6	People's Gas } 2nd Mtg. of Chicago } Bonds .	102—106	..	5 13 2
800,000	100	Jan. 2	5	Australian 5 p. c. Deb. .	102—104	..	4 16 2								
230,000	5	May 16	6	Bombay, Ltd. . . .	6—6½	..	4 12 4	851,070	10	Apl. 27	7	River Plate Ord. . . .	10½—10⅝	..	6 10 3
40,000	5	,,	6	Do. New, £4 paid .	4—4½	..	5 6 8	250,000	Stk.	June 28	4	Do. 4 p. c. Deb. .	100 –102*	+1	3 18 5
880,000	Stk.	Feb. 23	12	Brentford Consolidated	250—260	..	4 12 4	250,000	10	Apl. 11	8	San Paulo, Ltd. . . .	1 3/16—1 5/16	..	6 8 0
270,000	,,	,,	9	Do. New . . .	185—190	..	4 14 9	135,000	Stk.	Mar. 14	10	Sheffield A.	245—247	..	4 1 0
50,000	,,	,,	5	Do. 5 p. c. Pref. .	140—145	..	3 9 0	209,053	,,	,,	10	Do. B.	244—246	..	4 1 4
159,375	,,	June 14	4	Do. 4 p. c. Deb. .	116—120	..	3 6 8	447,427	,,	,,	10	Do. C.	241—246	..	4 1 4
220,000	Stk.	Mar. 14	11½	Brighton & Hove Orig. .	230—240	..	4 15 10	5,600,000	Stk.	Feb. 23	5⅝	South Metrop., 4 p.c. Ord.	126—130	−1½	4 2 0
226,320	,,	,,	8½	Do. A. Ord. Stk. .	175—180	..	4 14 5	1,520,000	,,	Jan. 12	3	Do. 3 p. c. Deb. . .	97—99	−1	3 0 7
999,500	Stk.	Feb. 23	5	Bristol, 5 p. c. max. .	125—130	..	3 16 11	380,940	Stk.	May 16	5	Southampton Ord. . .	115—120	..	4 3 4
420,000	20	Mar. 29	10	British	39—41	..	4 17 7	70,825	,,	Dec. 29	4	Do. 4 p.c. Deb.	120—125	..	3 4 0
50,000	10	Feb. 23	12	Bromley, Ord. 10 p. c. .	24—26	..	4 12 4	120,000	Stk.	Mar. 14	6	Tottenham and Edmonton } A. 5 p.c. B. 3½ p.c. 4 p. c. Deb.	123—125	..	4 16 0
79,000	10	,,	9	Do. 7 p. c. . . .	19—21	..	4 5 8	250,520	,,	,,	4½		93 - 98	..	4 11 10
500,000	10	May 16	6	Buenos Ayres (New) Ltd.	9—9½	..	6 6 4	55,100	,,	June 14	4		111—115	..	3 9 7
220,000	Stk.	June 14	4	Do. 4 p. c. Deb. .	99—101	..	3 19 3	182,380	10	Jan. 12	5	Tuscan, Ltd.	7—8	..	6 5 0
150,000	20	Mar. 14	8½	Cagliari, Ltd. . . .	24—26	..	6 6 11	149,900	10	Jan. 2	5	Do. 5 p. c. Deb. Red.	101—104	..	4 16 2
100,000	10	June 14	8	Cape Town & Dis., Ltd.	14—15	..	5 6 8								
50,000	50	May 2	6	Do. 6 p.c. 1st Mort.	55—57	..	5 5 3								
550,000	Stk.	Apl. 11	13½	Commercial Old Stock .	275—285	−5	4 14 9								
236,425	,,	,,	10½	Do. New do. .	210—220	..	4 15 5								
288,237	,,	June 14	4½	Do. 4½ p. c. Deb. .	135—140	−1½	3 4 4								
800,000	Stk.	May 31	9	Continental Union, Ltd.	155—165	..	5 9 1					WATER COMPANIES.			
200,000	,,	,,	7	Do. 7 p. c. Pref. .	170—175	..	4 0 0	780,399	Stk.	June 28	11	Chelsea, Ord.	298—303*	..	3 12 7
51,600	Stk.	Feb. 23	14	Croydon A 10 p. c. . .	335—340	..	4 2 4	150,000	,,	,,	5	Do. 5 p. c. Pref. .	155—160*	..	3 2 6
173,400	,,	,,	11	Do. B 7 p. c. . .	265—270	..	4 1 5	160,000	,,	,,	4½	Do. 4½ p. c. Pref. '75	143—148*	..	3 0 10
555,000	Stk.	Feb. 28	5½	Crystal Palace Ord. 5 p.c.	116—120	..	4 7 6	175,785	,,	Mar. 29	4½	Do. 4½ p. c. Deb. .	145—150	..	3 0 0
60,000	,,	,,	5	Do. 5 p. c. Pref. .	130—135	..	3 14 1	1,720,560	Stk.	Apl. 11	7	East London, Ord. . .	190—195	−1½	3 11 10
486,090	10	Jan. 26	11	European, Ltd. . . .	19½—20½	..	5 7 4	654,740	,,	June 14	4½	Do. 4½ p. c. Deb. .	142—147	..	3 1 3
854,060	10	,,	11	Do. £7 10s. paid .	14½—15½	..	5 6 5	890,000	,,	,,	3	Do. 3 p. c. Deb. .	96—98	−1	3 1 3
14,993,075	Stk.	Feb. 9	4%	Gas- 4 p. c. Ord. . .	97—99	−2	4 19 0	700,000	50	June 14	7½	Grand Junction } 10 p. c. max. . 4 p. c. Deb. .	104—107	..	8 10 1
2,600,000	,,	,,	3½	light 3½ p. c. max. .	96—98	..	3 11 5	810,000	Stk.	Mar. 29	4		130—135	..	2 19 3
8,799,735	,,	,,	4	and 4 p. c. Con. Pref.	117—119	+1	3 7 5	708,000	Stk.	Feb. 23	14	Kent	307—312	..	4 9 9
3,993,975	,,	June 14	3	Coke 3 p. c. Con. Deb.	95—98	..	3 1 3	160,000	,,	,,	7	Do. New, 7 p. c. max. .	200—210	..	3 6 8
70,000	10	May 31	8	Hongkong & China, Ltd.	13¾—14¼	..	5 10 4	1,043,800	100	June 28	10½	Lambeth, 10 p. c. max. .	285—290*	..	3 12 5
2,800,000	Stk.	May 16	10	Imperial Continental .	203—205	−3	4 17 7	406,200	100	,,	8	Do. 7½ p. c. max. .	203—208*	..	3 16 11
473,600	Stk.	Feb. 9	3½	Do. 3½ p. c. Deb. Red.	100—103	..	3 8 0	350,000	Stk.	Mar. 29	4	Do. 4 p. c. Deb. .	130—133	..	3 0 2
75,000	5	June 14	6	Malta & Medn., Ltd. .	4½—5	..	6 0 0	500,000	100	Feb. 23	13½	New River, New Shares	422—427	..	3 3 2
560,000	100	Apl. 2	5	Met. of 5 p. c. Deb.	107—110	..	4 10 11	1,000,000	Stk.	Jan. 26	4	Do. 4 p. c. Deb. .	132—137	..	2 18 5
250,000	100	,,	4½	Melbourne 4½ p. c. Deb.	106—108	..	4 3 4	902,300	Stk.	June 14	7½	South-wark and } Ord. . . . 7½ p. c. max.. 5 p. c. Pref.	195—200	..	3 15 0
541,920	20	May 31	3½	Monte Video, Ltd. . .	10½—11½	..	6 1 5	126,500	100	,,	7½		182—187	..	4 0 3
667,946	Stk.	Feb. 23	9½	Newc'tle & Gatesh'd Con.	215—220	..	4 4 1	489,200	Stk.	,,	5		155—160	−2	3 2 6
299,855	Stk.	June 28	8½	Do. 8½ p. c. Deb. .	104—107	..	3 5 5	1,019,585	,,	Apl. 11	4	Vauxhall 4 p. c. A Deb.	129—134	..	2 19 9
100,000	5	May 16	8	Oriental, Ltd. . . .	7—7½	..	5 6 5	1,155,066	Stk.	June 14	10	West Middlesex . . .	280—285	..	3 10 2
135,000	5	,,	8	Do. New, £4 10s. pd.	6½—6⅝	..	5 6 5	200,000	,,	,,	4½	Do. 4½ p. c. Deb. .	145—150	..	3 0 0
15,000	5	,,	8	Do. do. 1879, £1 pd.	1¼—1½	..	4 11 5	200,000	,,	Mar. 14	8	Do. 8 p. c. Deb. .	99—101	..	2 19 5
					* Ex. div.								*Ex div.		

been in existence for 29 years. During all this time, in only three years has it paid its way; but the deficits were small, and the Directors were able to carry on. The significant thing is that it is the electric light which has proved to be the burden that has broken its back. Clearly the time has been reached when the electric light is no longer a draw. It is impossible to conceive of the Directors of a moribund institution like this introducing electricity for any other reason than that its novelty would make the place attractive—for of its costliness they must have been well aware. When the shopkeeper or the hotelkeeper comes to realize that it is no longer an attraction to his place to have it lighted by electricity, the age of sentiment will have ended; and when men begin to reason, by means of arithmetic, including the counting of £ s. d., the time will not be far distant when every system of lighting will be considered on its merits. When efficiency and cost come to be the ruling considerations, there can be no doubt as to which light will be adopted. Electricians officiously tell us that there will be a future for gas, in the consumption of it for cooking and heating. Let them take heed to their own prospect, lest in a few years their lighting business may have shrunk so that their chief stay will be the demand for electric supply for motive power—gas being restored to its place as the dominant artificial light of the world.

The other incident is that a new service of trains is to be inaugurated on the Midland route between London and Glasgow on Monday, in which the lighting is to be by gas, "owing to the uncertain working of the electric light on such journeys." Here, again, "lighted throughout by electricity" seems to have failed as an attraction. It will be interesting to see how soon this advertisement will disappear. When we find two great Railway Companies giving up electric lighting, we may be sure it is because they discover that the public have ceased to care for it, and are better satisfied with gas lighting. By the way, why are steamboats on short voyages—coasting steamers, say—not lighted by gas? It would be feasible, and quite safe, to have them so.

This is the season of the year when inspections of water-works are made. The greatest of these in Scotland is that of the Glasgow Corporation. It took place this year on June 21 and 22. On the first day, the party passed over some of the works in the vicinity of the city, and journeyed by Aberfoyle to the Trossachs Hotel, where they spent the night. Next day they devoted themselves to an inspection of the Loch Katrine works, and returned to Glasgow by Loch Lomond and train from Balloch. This is always a most popular excursion; and this year the party, headed by the Lord Provost, numbered about eighty. In a statement which has been prepared by Mr. J. M. Gale, the Engineer, it is stated that, by taking in the waters of Loch Arklet, a supply of 75 million gallons per day would be obtained, and that, if more water were desired, it would have to come from the further valley of Loch Voil and Loch Doine. The present supply is from the head waters of the Forth, and that which is foreshadowed would be from the head waters of the Tay. Thus would a large quantity of water which should naturally fall into the German Ocean be diverted into the Firth of Clyde. In this way, mankind vary throughout the country, if they do not always improve, the face of Nature.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *June* 30.

Sulphate of Ammonia.—A very weak tone has pervaded the market throughout the week; and quotations have declined to £10 12s. 6d. to £10 15s. per ton, delivered f.o.b. at the ports. Orders have been extremely scarce, and have been easily covered at the decline. The larger makers seem inclined to resist any further drop in values; but the smaller makes are being offered as they become available. A fair amount of business has been done over early autumn months, at a small premium on prompt values; but, at the close, there are no buyers, unless at a discount. Delivery further ahead is altogether neglected.

Nitrate of Soda is a shade firmer at 7s. 10½d. to 8s. 3d. per cwt., according to quality, on spot.

LONDON, *June* 30.

Tar Products.—There is not much actual business passing at present in products. Creosote users appear a little more anxious to cover themselves for forward business, concluding no doubt that lower prices are improbable. Benzol buyers also seem more keen to cover some of their requirements at to-day's prices, which are considerably above the lowest. Pitch and carbolic are both steady, although actual business is limited. There is no change in anthracene.

Prices are as follows: Tar, 17s. 6d. to 28s. Pitch, east coast, 37s.; west coast, 34s. Benzol, 90's, 6d. to 8d.; special qualities for gas, 9½d.; 50's, 10½d. Toluol, 1s. 1d. Solvent naphtha, 1s. 1d. Crude naphtha, 3¾d. Heavy naphtha, 1s. Creosote, 2¼d. Heavy oils, 3d. Carbolic acid, 50's, 2s. 1d.; 60's, 2s. 7d. Naphthalene salts, drained, 33s.; pressed, 75s. Anthracene, "A," 4d.; "B," 2¾d.

Sulphate of Ammonia is still a weak market, at £10 7s. 6d. to £10 12s. 6d., less 3½ per cent.

COAL TRADE REPORTS.

From Our Own Correspondents.

Lancashire Coal Trade.—Taking the coal trade of this district all through, the position continues exceedingly strong. It is true that the better qualities of round coal, owing to lessened requirements for house-fire purposes, are beginning to accumulate; but nothing of any real weight has so far been put down, and stocks remain exceptionally low for the time of the year. The inland demand upon the commoner qualities of round coal for steam and forge purposes, is not quite so pressing as it has been; but any falling off in this direction is more than counterbalanced by an increased demand for shipment. For all descriptions of round coal prices are firm at the full rates that have been quoted of late—ranging from 13s. per ton at the pit for ordinary descriptions of steam and forge coals up to 13s. 6d. and 14s. for common house coal, and 15s. to 15s. 6d. for the best qualities. Now, however, that pretty nearly all the important contracts have been settled, both in gas coal and for large manufacturing requirements, there is a general disposition

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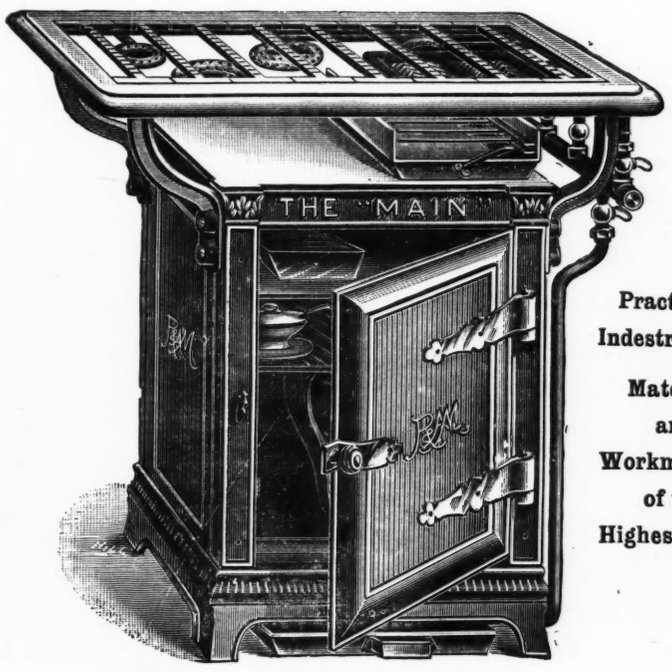

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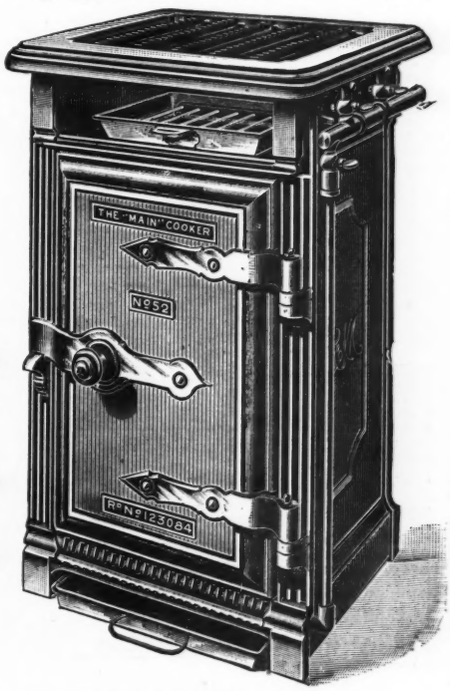

Prices from 25s. to 80s.

to buy sparingly at present rates; and the business put through is mostly of a hand-to-mouth character. But with the shortness of supplies, colliery proprietors are not at all eager sellers; and so far as the future prospects of prices are concerned, the only question would seem to be to what extent house-fire descriptions will be further advanced later on in the year. Engine classes of fuel during the last week or two have gradually become more plentiful on the market. Here and there at Lancashire collieries the production of slack is in excess of the demand; while from outside districts—chiefly Derbyshire and Staffordshire—fairly large quantities are coming forward, which are competing on the market here at prices below those that Lancashire collieries are quoting. This does not, however, affect the continued firmness of prices in this district; 10s. 6d. per ton remaining the minimum basis for common sorts, and 11s. to 11s. 6d. for the better qualities. For shipment, as already stated, there is an active inquiry, with slightly improved prices, if anything, being obtained. About 14s. 6d. per ton is the minimum for unscreened, and 15s. 3d. to 15s. 6d. per ton is secured for screened steam coal, delivered at the ports on the Mersey. For coke, the demand is quite as active as ever; and prices continue strong at the full rates—ranging from 24s. and 24s. 6d. per ton for furnace, to 32s. per ton for best foundry cokes.

Northern Coal Trade.—Trade has been disturbed by local holidays, which have tended to restrict production, more especially in Northumberland. Prices have, however, not been very materially altered. Best Northumbrian steam coals are about 17s. 6d. per ton f.o.b., and steam smalls are 12s. 6d.; the demand being moderate, and met by the output, which is now nearly normal again. In the gas coal trade, there are still very heavy deliveries; but with the commencement of July, a further part of these are at the newer prices—more remunerative to the coal-owners. For occasional cargoes, the price quoted varies from 16s. 6d. to 17s. per ton f.o.b. for best Durham gas coals; but the demand is relatively limited, so much of the output being taken up by the contracts. In coke, there is a strong demand; and the price is maintained at 35s. per ton f.o.b. for best Durham coke. Gas coke will now show some of the changes in the contracts which are made at the end of the half year, but the exact prices of which have not yet transpired. Stocks of gas coke are somewhat limited, and, of course, the output at this time of the year is very moderate.

Scotch Coal Trade.—There is no change to record; but the rumours continue of the enforced closing of public works for some weeks at the holiday time, which is said to be the result of want of new orders, which, again, is the result of the high prices that are being asked by manufacturers. The statement is made that coal-masters are not to advance the price of coal during July. This will be the first break in the upward tendency, and may be the fore-runner of lower prices. The quotations are: Main 14s. 6d. to 15s. per ton f.o.b. Glasgow, ell 16s. to 17s., and splint 16s. to 16s. 6d. The shipments for the week amounted to 280,612 tons—an increase of 58,290 tons over the preceding week, and of 64,180 tons over the corresponding week of last year. For the year to date, the total shipments have been 5,025,043 tons—an increase of 1,044,267 tons over the same period of the previous year.

Bursts in the Vyrnwy Aqueduct.—Recently there was a burst on the Vyrnwy pipe-line near Delamere Forest; but last Tuesday the Water Engineer (Mr. James Parry) reported that it was not a serious one, and the supply was resumed the previous day. The day that he made this report, local papers recorded that the Cheshire village of Colebrook, near Tarporley, ran some danger of being swamped the preceding Saturday afternoon, when another large main from Vyrnwy burst. Amid great excitement a message was promptly despatched to the reservoir keeper in the locality; and the water was turned off. In the meantime, a tremendous volume escaped, flooding several fields. The flow had been reduced from 14 million to 2 million gallons owing to a burst at Oswestry; otherwise the consequences might have proved very serious.

The New Water-Works of the Lancaster Corporation.—On the invitation of the Chairman (Alderman Huntington) and members of the Water Committee, the Lancaster Corporation have paid their annual visit to the water-works. At Blea Tarn the evidences of progress in the greatest and most successful undertaking in connection with the Corporation water supply were most marked. Seven acres of water cover what was not long ago a bog, representing 25½ million gallons, notwithstanding the very dry spring. The shingling of the reservoir has been completed, and also a large part of the broad concrete beach. The valve-tower, already a massive and commanding piece of masonry, has to have some 17 feet added to complete it. The capacity of the reservoir when finished will be 120 million gallons; and its cost has been at the rate of £500 for every million gallons, as compared with £1000 per million gallons expended on the Damas Gill scheme. The work has been carried out at less than the estimate, which does great credit to the Borough Engineer (Mr. J. Cook), who has planned and executed every detail of the work without contracting.

The Cray Water Scheme of the Swansea Corporation.—The large water scheme which the Swansea Corporation have in hand does not appear to be moving forward at a rapid pace; and the "Cambrian" has been endeavouring to stir matters up a bit. Remarking that it has reason to believe the contract is not proceeding satisfactorily, our contemporary says: "A little over £11,000 was paid the contractors up to September last. Did this £11,000 (with, we suppose, certain retentions) represent as much work as ought to have been carried out since the contract was signed in June, 1898? What has been paid since last autumn? An examination of the accounts will show that the payments have by no means been in proportion to the contract. The time for the completion of the same, if we remember aright, does not exceed, if it comes up to, four years; and the contractors have already taken more than a quarter of the time to do work which represents a very small part of the amount they tendered for the contract—viz.,—£255,747. It is most important from every point of view that the contract should be completed within the stipulated period. The town cannot afford any delay involving, over the period longer than was at first intended, the payment of substantial salaries to the Resident Engineer, inspectors, and so forth, the interest on capital borrowed and lying idle, the putting off of the financial return from the scheme, and the adequate supply of water which is needed in Swansea."

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GAS APPARATUS..LONDON
STOVES.....WARRINGTON
OGEN.....LONDON

"Fetch forth the stocks, ho!"—Lear II., 2.

The Cleckheaton District Council and the Bradford Corporation Bill.—At a meeting of the Bradford Corporation Parliamentary Committee last Thursday, it was stated that the Cleckheaton District Council had undertaken to withdraw their opposition to the gas clauses of the Corporation Bill on an undertaking being given in regard to the price to be charged for gas.

The Cape Town District Water-Works Undertaking.—The works of the Cape Town District Water-Works Company, Limited, are about to be transferred to the Local Authorities. The Company supply the four suburban districts of Claremont, Woodstock, Rondebosch, and Mowbray. The Councils of the two first-named places were the movers in the purchase scheme; and, after arbitration, the undertaking has been handed over to them for the sum of £223,000. Rondebosch and Mowbray have the option of coming in as partners, and the ratepayers of both districts have decided to join in the purchase. The undertaking will in future be managed by a Water Board on which all the four Municipalities will be represented.

Dorking Councillors and a Rise in the Price of Gas.—The Dorking Gas Company have recently issued a notice to the consumers to the effect that the price of gas is to be raised by 6d. per 1000 cubic feet. As is usually the case when there is a rise in any commodity, this has produced a great deal of indignation—especially among the members of the District Council. A resolution was moved by Mr. Tebbs at the last meeting, to the effect that the Council had learnt with regret that the Company had decided to raise the price of gas; and "as this prosperous Company have just declared a full dividend, and carried a large sum to reserve," the Council hoped the Directors would reconsider their decision. Mr. Tebbs, in moving his resolution, paid a great compliment to the business capacity of the Directors: and then, presuming (it is to be supposed) that he knew more about their business than they did themselves, he gave them a little advice. Having done this, he threatened them with the electric light; and then made an appeal to their sense of honour and justice. Mr. Tebbs was hardly diplomatical in his method of reasoning with the Directors. Concluding his speech, he said: When Parliament granted the Company their Act, it was expressly laid down that in no year should the average dividends amount to more than 10 per cent. Surely Parliament meant that, whenever a sum of money was earned in any one year, or succession of years, over and above that sufficient to pay the shareholders 10 per cent, the consumers should have the benefit of the surplus amount. What was the fact? At the last meeting of the shareholders, they paid the maximum dividends on all shares, which absorbed £1038, and left a balance of £1534 to be carried to the next account. This meant that, after paying the 10 per cent. dividend, they had actually in hand sufficient money to pay another year-and-a-half's dividend at the same rate. Instead of raising the price of gas, they ought to lower it. The resolution was passed, with a rider instructing the Clerk to examine the Company's last balance-sheet, and advise the Council whether the Directors were justified in carrying large sums to a reserve account, and in purchasing property and extending their works, without first reducing the charge to consumers of gas throughout the district.

New Water-Works for Taunton.—The Taunton Town Council have recently paid a visit to their Leigh Hill water-works for the purpose of laying, with due formality, the keystone of the culvert of a large reservoir about to be constructed at Luxhay. The Council already have two storage reservoirs—one at Leigh and the other at Blagdon; the total storage capacity being about 38 million gallons. The town, however, is growing so rapidly, and its manufactures are increasing at such a rate, that, although the last reservoir was finished as recently as 1894, it is now found necessary to construct another. For this purpose a large quantity of land has been purchased at Luxhay; and extensive additional water rights have been secured. The storage capacity of the new reservoir will be 120 million gallons; and the water area when the reservoir is full will be about 18 acres. In laying the keystone of the culvert, Alderman Adams, the Chairman of the Water Committee, made an interesting speech, tracing the history of the undertaking from the time that the property was purchased from the old Water Company by the Town Council, upon the re-incorporation of the borough in 1877.

The Leamington Gas-Works Purchase Question: An Expert's Engagement Cancelled.—This is an extract from the "Warwick Advertiser" of last Saturday's date: "Under the arrangement for promoting the transfer of the Leamington gas undertaking to the Corporation, it will be remembered that the Corporation recently appointed Mr. Thomas Newbigging, of Manchester, as their Arbitrator. In this capacity he will have to meet the arbitrator appointed by the Leamington Gas Company. The latter are advised by Mr. George Livesey, the Chairman of the South Metropolitan Gas Company. In the event of these gentlemen disagreeing, they will, under the terms of the Lands Clauses Act, have to appoint an Umpire, and an arbitration will follow to decide the value of the undertaking. In connection with this contingency, we have it on good authority that the Gas Purchase Committee met on the 23rd inst. and appointed three Engineers as expert witnesses—viz., Mr. Hunt (the Engineer of the Birmingham Gas Corporation Department), Mr. E. H. Stevenson (son of the late Mr. George Wilson Stevenson), and Mr. Arthur Silverthorne (the pioneer of gas purchases in this country and a well-known supporter of 'ratepayers'' interests). From what we have been able to gather, for two days last week a most notable contest has been waged in the House of Lords over the Morecambe Gas Bill. . . . . Mr. Silverthorne was examined at great length on behalf of the outside authority of Heysham, and confirmed the opinion generally entertained throughout Lancashire, that it was an improvident purchase that would necessitate a considerable increase in price in addition to any increase following the rise in value of coal. The Bill passed through the Lords, although its passage through the Commons established the fact that the Committee regarded the bargain with considerable suspicion. Mr. Silverthorne's outspoken evidence must have caused deep umbrage to the supporters of the alleged bargain, as it is an open secret that pressure has since been brought to bear on the Leamington Committee, and the 'ratepayers' expert's' appointment has since been cancelled. We should expect the ratepayers would like to know at whose instigation?" And it would be interesting to "JOURNAL" readers to know who is the author of this paragraph.

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WINDSOR ST. WORKS, BIRMINGHAM	2,000,000
SALTLEY WORKS, BIRMINGHAM	2,000,000
COLCHESTER	300,000
BIRKENHEAD	2,250,000
SWINDON (New Swindon Gas Co.)	120,000
SALTLEY, BIRMINGHAM (Second Contract)	2,000,000
WINDSOR ST., BIRMINGHAM (Second Cont.)	2,000,000
HALIFAX	1,000,000
TORONTO	250,000
OTTAWA	250,000
LINDSAY (Remodelled)	125,000
MONTREAL	500,000
TORONTO (Second Contract; Remodelled)	2,000,000
BELLEVILLE	250,000
OTTAWA (Second Contract)	250,000
BRANTFORD (Remodelled)	200,000
ST. CATHERINES (Remodelled)	250,000
KINGSTON, PA.	125,000
PETERBOROUGH, ONT.	250,000
WILKESBARRE, PA.	750,000
ST. CATHERINES (Second Contract)	250,000

	Cubic Feet Daily
BUFFALO, N.Y.	2,000,000
WINNIPEG, MAN.	500,000
COLCHESTER (Second Contract)	300,000
YORK	750,000
ROCHESTER	500,000
KINGSTON, ONT.,	300,000
CRYSTAL PALACE DISTRICT	2,000,000
DULUTH, MINN.	300,000
CATERHAM	150,000
LEICESTER	2,000,000
ENSCHEDE (HOLLAND)	150,000
BUENOS AYRES (RIVER PLATE CO.)	700,000
BURNLEY	1,500,000
KINGSTON-ON-THAMES	1,750,000
ACCRINGTON	500,000
TONBRIDGE	300,000
STRETFORD	500,000
OLDBURY	300,000
TODMORDEN	500,000
SALTLEY, BIRMINGHAM (Third Contract)	2,000,000
YORK (Second Contract)	750,000
ROCHESTER (Second Contract)	500,000
NEWPORT (MON.)	250,000

Newbury Gas Affairs.—The Newbury Corporation have, on the recommendation of the Gas Committee, resolved to apply for a loan of £2500 in connection with the gas undertaking. The Committee have had tenders for coal under consideration at an average price of £1 2s. 1½d. per ton. It is expected that the advanced price of coal will cost the undertaking £800 more than under the last contracts.

Gas-Works Profits at Stoke-on-Trent.—At last Wednesday's meeting of the Stoke Town Council, Alderman Geen, in moving the adoption of the Gas Committee's minutes, said the make and sale of gas for the year ended March 31 was the highest on record; and after meeting all charges (including instalments of principal and interest on loans), the profit was also the highest on record—viz., £3881. As regarded £2390, it had been applied to relieving the rates by making no charge for public lighting and cleaning and repairing the lamps. The balance of the profit had been expended on extensions. The minutes were passed.

Leeds Gas Coal Contracts.—In response to their advertisements, it is reported that the Leeds Corporation Gas Committee received tenders for about four times as much coal as they will need during the nine months October to March next. Referring to the meeting of the Gas Committee last Tuesday to consider the tenders, the "Yorkshire Post" says: From a casual glance at the tenders, it was apparent that the average advance in price on last year's rates is at least 5s. a ton. As to the conditions—in reference to which, it will be remembered, representatives of West Yorkshire coalowners and of various Corporations recently endeavoured, but in vain, to come to an agreement—they vary a good deal. Some of the tenders specify the coalowners' new terms of contract; others are filled in on the Gas Committee's form of tender; while some of the firms (to quote a member of the Committee) name conditions of their own. The Committee will meet shortly to examine the tenders, with special reference to the conditions, before coming to a decision.

Queen's Birthday Entertainment at the Port Elizabeth Gas-Works.—The employees of the South African Lighting Association, with their wives, children, and friends, according to custom, celebrated the Queen's Birthday with a most enjoyable entertainment at the Mutual Hall, Port Elizabeth, on Wednesday, May 23. The hall was brilliantly illuminated by two incandescent gas clusters each of 1000-candle power, costing about 4d. per hour—a striking illustration of the efficiency and economy of gas. A capital programme, comprising music and gymnastic displays, entertained and amused the large audience; and during an interval light refreshments, tea, and coffee were handed round. Mr. W. Arnott, the energetic Manager, was untiring in his attention to the comfort and entertainment of the guests. In addition to taking the chair and looking after things generally, he gave an interesting lantern exhibition of photographic views, including a unique series depicting the devastation wrought by the flood some years since, and other subjects of local and general interest. During the evening, he mentioned that eight men from the works were serving the Queen in the Boer war. He expressed the hope that Her Majesty's next birthday would be celebrated under one united flag of South Africa. He referred with gratification to the fact that the gas-works were now as well equipped as any at home.

The Middlesex Gas-Meter Testing-Station.—The new meter testing-station erected by Messrs. T. Glover and Co. at Edmonton has now been completed, and work was commenced yesterday. The County Council of Middlesex last Thursday passed a resolution putting in force the Sale of Gas Acts, and providing for ten 10-feet and two 20-feet gasholders.

The Price of Gas at Cleckheaton.—The Gas Committee of the Cleckheaton District Council find that their new coal contracts represent an additional charge of £2160 for the year. But it is expected that £800 additional revenue will be derived from the sale of residual products at increased prices; and the Committee deem it prudent to sacrifice profits to the extent of the remaining £1300, if necessary, rather than advance the charge for gas. The profits have amounted in recent years to from £1300 to £1500 annually; and the consumption of gas is constantly increasing, with a corresponding margin of profit.

The Prospect of Dearer Gas at Birmingham.—Reference has already been made, says the "Birmingham Daily Post," to the possibility of the increased cost of coal affecting the price of Birmingham gas. Coal-owners throughout the country have announced their intention of demanding an increase of 5s. per ton as compared with the contracts of last year; and this on Birmingham's annual purchase (based on last year's figures) of 527,221 tons, means an increase of £131,805 on the city's gas bill. The amount of the actual increase demanded has not been allowed to transpire; but we understand that at Thursday's meeting of the Gas Committee, when tenders were considered, it was apparent that "an early and substantial advance" in the price of gas is inevitable. The amount of the increase which will be necessary has not yet been settled; but, as bearing on the point, it may be mentioned that, though coke and tar prices remain at a high figure, other residuals tend to decrease.

The Price for Public Lighting in Stockport Out-Districts.—The Stockport Gas Committee recently intimated to the Heaton Norris District Council that, on and after June 24, the additional charge for public lighting would be 1s. 6d. per lamp per annum for every penny extra per 1000 cubic feet of gas charged to private consumers. The increase in the charge to private consumers is 4d. per 1000 cubic feet; so that the additional cost for public lighting will be 6s. per lamp. The matter came before the Heaton Norris Council at their last monthly meeting, when it was mentioned by Mr. Barton that there were at present in the district 300 lamps, which cost £1 6s. 9d. for gas, and £1 4s. 3d. for lighting and repairs; making a total of £2 11s. He considered the notice from the Corporation to be peremptory. If 6s. per lamp were added, it would bring the amount for gas, lighting, and repairs to £2 17s. per lamp, which was excessive. Last year the Stockport gas profits were something like £6000; and in these profits Heaton Norris did not participate at all. If a 2d. increase in price would pay Salford, it would pay Stockport; and therefore to make a profit over and above the extra cost of coal and cannel was not fair to the consumers. He found that Reddish was only charged 11s. for lighting and repairing, while Heaton Norris had to pay £1 4s. 3d., and Levenshulme only 11s. 9d. Other members supported Mr. Barton's remarks; and a deputation was appointed to wait upon the Corporation Gas Committee relative to the matter.

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TYSOE'S SELF-SEALING MOUTHPIECES.

Tar-Distilling Plants. Claus' Sulphur-Recovery Plants.

SULPHATE OF AMMONIA PLANTS.

The Water Supply of Birkenhead.—The Birkenhead Town Council were privately engaged for several hours last Friday discussing the question of the water supply of the borough. At the close, two resolutions were passed. The first requested the Gas, Water, and Electrical Committee to make full inquiry and report upon the matter, and authorized the obtaining of expert advice. The second resolution approved the laying of mains from the Vyrnwy aqueduct through the borough to the Wallasey district, subject to the necessary protective conditions.

The Halifax New Water-Works Contract.—At last Tuesday's (special) meeting of the Halifax Town Council in Committee, the tenders for the construction of three new reservoirs at Walshaw Dean were considered. Five firms had sent in tenders. Members of the Labour Party urged that the new works should be constructed by direct labour; but the Council resolved that the work should be done by contract. The tender accepted was that of Mr. Enoch Tempest, of Manchester; the amount being £170,766. The highest tender sent in was for £353,567. It is anticipated that the new reservoirs will be completed within about four years.

Budleigh Salterton Water Supply.—Mr. F. Hammond has presented a report to the Budleigh Salterton District Council on the condition of the water-works. He expresses the opinion that the leakage of the Sherbrooke reservoir is caused by the fracture of a wash-out drain which passes under a portion of the floor of the reservoir. It will, however, be necessary for a careful test to be made before a remedy can be found. As to the consumption of water, he advised the Council to put into working order a Deacon waste-water meter which they have fixed, but do not use. He believes that with the waste kept under control, and the works in proper order, they have ample supply for the present. The collection of information as to the yield of the present sources and the consumption of water may save the town from blundering into a costly and unnecessary undertaking.

Coventry Water-Works Accounts.—The annual report of the Coventry Corporation Water Committee has been before the Council. It stated that the receipts during the financial year were £9569, as against £10,594. The decrease, however, was only due to the alteration of the date of collection; and the collection for the current year would restore the balance. The expenses had increased by £449. The balance of revenue over working expense was £2955; and the interest allowed by the bank, £233, made a total of £3189. The capital charges were £1975; the net profit £1213. There was a balance in the Treasurer's hands of £5236, of which £1500, representing half the sum of £3000 appropriated in aid of the rates last year, would be handed over to the borough fund in the course of the current half year. This left £3736. The profits for the current year were estimated at £4712. The Committee were of opinion that, after making full provision for repairs, and all other outstanding liabilities, the Council would be justified in making an appropriation in aid of the rates. They accordingly recommend that £3000 be so appropriated and paid over to the borough fund in aid of the next two borough rates, in equal moieties. On the motion of Alderman Road, the report was adopted.

Messrs. Richmond and Co., Limited, have been showing at Aberdeen a representative collection of their stoves in connection with the Northern Exhibition Syndicate; and the result was the receipt of orders for 640 of their best grade "Model" cookers (no "slots" being included) in seventeen days. They consider this establishes a "record" for any exhibition, and it was due to the systematic application of unique methods of advertising, interviewing, and canvassing which were inaugurated at Aberdeen; and they believe similar results are possible elsewhere, by a careful study of the best points to be put before consumers.

Though the International Tramways and Light Railways Exhibition which was opened at the Agricultural Hall, Islington, on the 23rd ult., and will close to-morrow, does not furnish any example of the application of gas to the propulsion of tramcars, it contains several gas-engine and other exhibits which may be briefly noticed. The largest gas-engine is shown by the British Westinghouse Company—having a maximum capacity of 125 brake horse power when operating with illuminating gas of good average quality. This engine is specially adapted for direct driving in electrical work; and it is shown connected to a Westinghouse 500-volt 75-kilowatt compound-wound engine-type generator, supplying current for the Westinghouse apparatus. Close by is the track which the Company have laid down for running a car the length of the hall. The conduit is laid centrally between the rails, and contains two conductors—one for the supply and the other for the return current. The car picks up the current from one and gives it back to the other. One point in the Westinghouse system is of importance to gas and water engineers—the current cannot get away through gas and water pipes; the conduit being completely insulated. While on this subject, it may be mentioned that Messrs. Doulton and Co., Limited, have a fine show of their hard-burnt glazed stoneware conduits, which have been largely adopted since their introduction in 1892. Messrs. Crossley Bros., Limited, have two gas-engines of 12 and 19 horse power (the former driving a dynamo), and an oil-engine of 2½ actual horse power. Messrs. Lawton and Parker exhibit two of their engines, of 2 and 7 brake horse power respectively. Tangyes Limited have among their exhibits a gas-engine of 8½, and an oil-engine on the Otto principle of 7½ brake horse power and also a show of pumps. A "Stockport" engine with two fly-wheels and all the latest improvements is shown by Messrs. Bilbie, Hobson, and Co., and several others are in use in the basement of the hall in connection with the electric lighting installation. Messrs. Meldrum Bros., Limited, have on view their "Koker" mechanical stoker and a model of their "Simplex" destructor, as working in connection with the Darwen electric supply station, where the town's refuse furnishes all the power for the works. They also exhibit their econometer—an instrument for testing chimney gases, and facilitating the discovery and remedy of defective combustion. Türr's Acetylene Gas Syndicate, Limited, show how their gas is generated and employed for lighting purposes; and the exhibit of the Matchless Gas Lighting Syndicate, Limited, represents their system of lighting gas without the aid of tapers, matches, or a pilot jet, and its application to incandescent gas lighting, gas-fires, &c. Two of Messrs. Richmond and Co.'s stoves are used to illustrate the adaptability of the principle to the lighting of such appliances.

LATEST DEVELOPMENT
IN
GAS-COOKERS

WRIGHT'S PATENT,
BY WHICH ALL THE
ADVANTAGES OF LOOSE BURNERS
ARE OBTAINED
WITHOUT
ANY OF THE DISADVANTAGES.

NO EXTRA CHARGE IS MADE
FOR THESE IMPROVEMENTS.

JOHN WRIGHT & CO.
LIMITED,
LONDON & BIRMINGHAM.

NOTICE TO ADVERTISERS.—COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office *not later* than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of, PERMANENT ADVERTISEMENTS should be received not later than the FIRST POST on SATURDAY.

GAS PURIFICATION AND CHEMICAL COMPANY, LIMITED.

OXIDE OF IRON.

O'NEILL'S Oxide has a larger annual sale than all other Oxides combined. Purity and uniformity of quality guaranteed.
JOHN WM. O'NEILL, Managing Director,
160, 161, & 162, PALMERSTON BUILDINGS,
OLD BROAD STREET,
LONDON, E.C.
ANDREW STEPHENSON, AGENT. All communications *re* Oxide to the Company as above.

WINKELMANN'S
"VOLCANIC" FIRE CEMENT.
Resists 4500° Fahr. Best for use in GAS-WORKS.
ANDREW STEPHENSON,
182, Palmerston Buildings,
Old Broad Street,
"Volcanism, London." London, E.C.

BROTHERTON & CO.
Offices: Commercial Buildings, LEEDS.
Correspondence invited.

HYDRATED OXIDE OF IRON.
PREPARED from Pure Iron.
Twice as Rich as Bog Ore.
Gives no Back Pressure.
The Cheapest in the Market.
Can be Lent on Hire.
Can be Exchanged for Spent Oxide.
READ, HOLLIDAY AND SONS, LTD., HUDDERSFIELD.

AMMONIACAL LIQUOR wanted.
BROTHERTON AND CO., Ammonia Distillers.
Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

TO GAS AND WATER OFFICIALS.
HIGH-CLASS Cycles at reasonable and low Prices. Guaranteed for Twelve Months. Sent on approval. For Cash or Gradual Payment System. Send for Catalogue, Post Free.
MELROSE CYCLE COMPANY, COVENTRY.

SULPHURIC ACID for Sale.
BROTHERTON AND CO., Chemical Manufacturers.
Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

SPECIAL PAINT FOR GAS-WORKS.
JOHN E. WILLIAMS AND CO.,
VICTORIA PAINT WORKS,
MANCHESTER.
Telegrams: "ENAMEL." National Telephone 1759.

GAS TAR wanted.
BROTHERTON AND CO., Tar Distillers.
Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

JOHN RILEY & SONS, Chemical Manufacturers, Hapton, near Accrington, are MAKERS of SULPHURIC ACID, from Brimstone, for Sulphate of Ammonia Making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol. References given to Gas Companies.

PATENTS FOR INVENTIONS.
Messrs. J. C. CHAPMAN & CO., Chartered Patent Agents, ADVISE ON ALL MATTERS CONNECTED WITH ABOVE.
Information and Handbook on application.
70, CHANCERY LANE, LONDON, W.C.

ENRICH your Gas with cheap Benzol.
Specially prepared, free from sulphur. At to-day's Price of Benzol, ILLUMINATING POWER costs less than ONE-THIRD OF A PENNY PER CANDLE.
Apply to SADLER AND CO., MIDDLESBROUGH.

PRACTICAL RETORT SETTERS.
GEORGE NUTTALL & CO., 32, Havelock Road, Saltley, Birmingham.
Regenerator or other Furnaces erected to Engineers' own Designs. Best Work Guaranteed. Please write for Estimates.

SULPHATE OF AMMONIA SATURATORS.

JOSEPH TAYLOR & CO., Chemical Plumbers, &c., and Makers of every description of Solid Plate Lead and Timber Cased Saturators, &c., CENTRAL PLUMBING WORKS, TOWN HALL SQUARE, BOLTON. Special attention to Repairs.
Before placing Orders, please write for Estimate.
Telegraphic Address: "SATURATORS, BOLTON."

PORTER & CO., Gowts Bridge Works, LINCOLN, Engineers, Ironfounders, and Contractors for the erection of Gas-Works for Towns, Villages, Mansions, Manufactories, Collieries, and Isolated Buildings at home and abroad. Manufacturers of Retorts and Fittings, Condensers, Scrubbers, Purifiers, Valves, &c.; also of Girders, Wrought and Cast Iron Tanks, Iron Roofs, &c.
Telegraphic Address: "PORTER, LINCOLN."
[For Illustrated Advertisement, see p. 53.]

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM; and 45 & 47, Westminster Bridge Road, LONDON, S.E.
First-Class Award, Melbourne Exhibition, 1889, for WET AND DRY GAS-METERS, STATION METERS, AND GOVERNORS, PRESSURE-GAUGES, STREET LAMPS AND PILLARS, &c.
Telegraphic Addresses:
"Braddock, Oldham." "Metrique, London."

SULPHURIC ACID.
JOHN NICHOLSON & SONS, Limited, Chemical Works, Leeds, specially produce this ACID from SULPHUR, for making SULPHATE OF AMMONIA of high quality and *good* colour. Delivery in our own Railway Tank-Waggons or Carboys. Highest references and all particulars supplied on application.

CANNEL, COAL, ETC.
JOHN ROMANS & SON, EDINBURGH, Gas Engineers, supply all the most approved SCOTTISH CANNELS; also FIRE-CLAY GOODS, CAST-IRON PIPES, and other APPARATUS for GAS and WATER WORKS.
Prices, &c., will be forwarded on application.
No. 30, ST. ANDREW SQUARE, EDINBURGH, } SCOTLAND.
NEWTON GRANGE, NEWBATTLE, DALKEITH, }

TRAVELLER, with old and extensive connection among Gas Companies, is open to REPRESENT a Firm of Fire-Clay Retort and Brick Manufacturers and General Gas Plant Contractors.
Address No. 3521, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FITTER, good all round, wanted.
Apply to the MANAGER, Gas-Works, KNOWLE.

WANTED, a Young Man as Gas-Fitter.
Good character. State Age and Wages.
Apply to Mr. LANE, Gas-Works, Aylesbury, BUCKS.

WANTED, immediately, a steady, reliable, and competent Man (married man preferred) as RENTAL and GENERAL CLERK in a Gas and Water Office. Must have held similar appointment, and be able to produce Testimonials as to Character and Ability. Salary 28s. per week.
Applications, with Testimonials, to be made to the MANAGER, Gas-Works, BEXHILL-ON-SEA.

WARE GASLIGHT AND COAL AND COKE COMPANY, LIMITED.

GAS MANAGER.

WANTED, a competent Gas Manager to take charge of Gas-Works in a Provincial Town 20 miles from London. Must thoroughly understand his business in all its Branches. Salary £120 per annum, with House, Fuel, and Light.
Applications, with *copies* of recent Testimonials, which will not be returned, to be sent to the undersigned, from whom Particulars may be obtained on application, on or before the 31st of July, 1900.
GEO. H. GISBY,
Secretary.

WANTED, a Carbonizing Foreman for the Royal Arsenal Gas-Works, Woolwich.
Applicants must thoroughly understand the proper working of Regenerative Settings, and have been in charge of Works using this method of Carbonizing. Experience of Inclined Retorts would be considered an advantage. Make of Gas between 200 and 300 millions per annum. Wages £3 10s. per week, or £3 if House be provided.
Apply, by letter only, in own Handwriting, to the Superintendent, Building Works Department, Royal Arsenal, Woolwich, not later than the 10th of July, giving Age, Qualifications, and References.
Particulars of the Duties may be had upon application.
C. O. BOOTH,
Manager B.W.D.
for Colonel (Ret.)
Superintendent Building Works.

ENGINES and Exhausters combined "Waller," to pass 30,000 cubic feet per hour DITTO to pass 7000 feet per hour, overhauled and complete. Cheap to clear. Also BOILERS.
J. FIRTH BLAKELEY AND CO., Thornhill, DEWSBURY.

GASHOLDER, 50 ft. by 20 ft., with Six Columns, 15 inches diameter, Wrought Lattice Girders, &c., complete and perfect. About Fourteen Years old.
Price, erected, on application to J. FIRTH BLAKELEY AND CO., Thornhill, DEWSBURY.

FOR SALE—Two small Boilers, 6 feet long, 3 feet diameter, each fitted with two 9-inch Flue Tubes. Equal to new, with Fittings and Furnace Doors and Frames. Price £12 10s. each, or £22 the pair.
Also two 8-inch FLANGED T-PIECES and ELBOW CONNECTIONS, for Exhauster Bye-Pass, with Cockey and Smith's Patent Bye-Pass Valve, 4-inch Branch, and Throttle Valve and Compensator.
For further Particulars apply to the MANAGER, Gas-Works, Sandown, ISLE OF WIGHT.

GAS PURIFICATION.

OXIDE OF IRON BOG ORE.

BALE & CO.'S Oxide of uniform quality. SPECIAL FIRE CEMENT, OXIDE PAINTS, OILS, SULPHURIC ACID, &c.
120 and 121, NEWGATE STREET, LONDON, E.C.
Telegrams: "BOGORE, LONDON."

SADLER & CO., Ltd., Middlesbrough, Tar Distillers and Tar Colour Manufacturers. BENZOL specially prepared for Gas Enrichment free from Sulphur. Pure Hydrated OXIDE OF IRON for Purifying Gas either for Sale or Lent on Hire. Always Buyers of GAS TAR and AMMONIACAL LIQUOR.

FOR SALE—Five splendid Tanks, about 7 feet in diameter, 25 feet deep, Wrought-Iron. Twenty Pounds each, f.o.r. Exeter. Useful on Gas-Works for Tar, Ammoniacal Liquor, Scrubber, &c. Subject unsold, net cash.
Apply WILLEY AND CO., Engineers, EXETER.

FOR SALE—Two Lancashire Boilers, each 6 ft. diameter by 20 ft. long, with Mountings. Been in use only a short time. Made by the Yorkshire Engine Company, Limited, Sheffield.
Apply to NEWTON, CHAMBERS, & CO., LIMITED, Thorncliffe Iron-Works, near SHEFFIELD, where the Boilers may be seen.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
J. F. BLAKELEY, Gas Engineer, Thornhill, DEWSBURY.

FOR SALE, very cheap—
WROUGHT-IRON SCRUBBER, 3 ft. 6 in. diameter by 27 ft. high, with 8-inch Bye-Pass Valves and Connections.
Five-inch Cast-Iron Vertical CONDENSER, Twelve Uprights, 20 feet or 29 feet high.
CORNISH BOILER, 4 ft. diameter, by 12 ft. long.
Apply to SAML. WHILE AND SON, 60, Queen Victoria Street, LONDON, E.C.

CONDENSERS, Washer-Scrubbers, "Cutler" patent CONDENSERS (14) 6 in. to 12 in. PIPE CONDENSERS, Patent WASHERS by "Livesey," "Holmes," and "Cockey," EXHAUSTERS up to 60,000 Cubic Feet per hour. ENGINES, BOILERS, &c. Several TOWER SCRUBBERS, PURIFIERS, METERS, GOVERNORS, PUMPS, TANKS, VALVES, &c.
J. FIRTH BLAKELEY AND CO., Gas Engineers, DEWSBURY.

TO COLLIERY PROPRIETORS.
THE Corporation of Haverfordwest invite TENDERS for the supply of about 1600 Tons of Double Screened GAS COAL, of the very best quality, to be delivered either at the Haverfordwest Railway Station, or at the Gas-Works Quay, Haverfordwest (by Water communication), in quantities as required by the Gas Manager during the Year commencing on the 24th of July, 1900.
Tenders by Friday, the 13th of July, 1900.
Forms and further Particulars of
R. T. P. WILLIAMS,
Town Clerk.
Council Chamber, Haverfordwest,
June 26, 1900.

COUNTY BOROUGH OF SALFORD.
(GAS DEPARTMENT.)

GENERAL STORES.

THE Gas Committee invite Tenders for the supply of the following Materials in such quantities as may be required during the Twelve Months ending Aug. 31, 1901.
1. WROUGHT IRON and STEEL.
2. LEAD PIPE, BLOCK TIN, TUBING, PEN DANTS, &c.
3. BOLTS, NUTS, and RIVETS, &c.
4. IRON CASTINGS, CAST-IRON PIPES, &c.
5. GUN-METAL METER TAPS and KEYS and BRASS LAMP TAPS.
6. WROUGHT-IRON STEAM and GAS TUBING, and SUNDRY FITTINGS.
7. GAS-METERS.
8. PAINTS, WHITE and RED LEAD, &c.
9. OIL and TALLOW.
10. TIMBER.
11. ROPE YARN and TWINE.
12. STEEL SHOVELS, GALVANIZED IRON SCOOPS and BUCKETS.
13. BRUSHES.
14. TESTING and REPAIRING WEIGHING-MACHINE.
15. GUN-METAL FITTINGS for METERS.
16. INDIA-RUBBER RINGS, TUBING and SHEETING, &c.

Forms of Tender and all Information may be obtained, and Samples may be seen, on application to the Gas Engineer, Gas Offices, Bloom Street, Salford.
Sealed Tenders, endorsed "Tender for Stores," addressed to the Chairman of the Gas Committee, Town Hall, Salford, to be delivered to me not later than Three p.m., on Thursday, July 12, 1900.
L. C. EVANS,
Town Clerk,
Town Hall, Salford.

GLASGOW CORPORATION.
(GAS DEPARTMENT.)

TENDERS FOR METERS.

THE Corporation invite Tenders for the supply of such METERS as may be required by them for Twelve Months from date of acceptance.

Forms of Tender may be obtained on application to Mr. Foulis, the Manager, at the Gas Office, 45, John Street, Glasgow; and sealed offers, marked "Tender for Gas-Meters," addressed to the Subscriber, will be received by him on or before Tuesday, the 17th prox.

The Corporation do not bind themselves to accept the lowest or any offer.

J. D. MARWICK,
Town Clerk.

City Chambers, Glasgow,
June 30, 1900.

BOROUGH OF ROCHDALE.

TO IRONFOUNDERS AND OTHERS.

THE Gas Committee of the above Cor- poration invite TENDERS for the supply and erection at their Gas-Works, in Dane Street, of a CAST-IRON AMMONIACAL LIQUOR CISTERN (Covered), 30 ft. by 25 ft. by 10 ft. deep.

Particulars may be obtained on application to Mr. T. Banbury Ball, the Manager, at the Gas-Works.

Tenders, endorsed "Liquor Tank," must be sent in to me not later than noon, on Wednesday, July 18, 1900.

By order,
JAMES LEACH,
Town Clerk.

Town Hall, Rochdale,
June 29, 1900.

BOROUGH OF HEYWOOD.

THE Gas Committee invite Tenders for the supply of LIME, TUBES and FITTINGS, and SULPHURIC ACID.

Specification and Form of Tender may be obtained from Mr. W. Whatmough, Gas Manager.

Contractors tendering for this work must pay their workpeople at least the Standard or Trade Union Rate of Wages, and observe the Trade Conditions which attach to the various kinds of Work for which the Tender is sent in.

Sealed and endorsed Tenders to be sent to me not later than Tuesday, July 17, 1900.

By order,
J. H. BALDWICK,
Town Clerk.

Municipal Buildings, Heywood,
June 20, 1900.

SUTTON-IN-ASHFIELD URBAN DISTRICT COUNCIL.
(GAS DEPARTMENT.)

TENDERS FOR GAS COAL, CANNEL, AND LIME.
TENDERS FOR TAR AND AMMONIACAL LIQUOR.

COAL.

THE Gas Committee of the above Council are prepared to receive TENDERS for the supply of 400 Tons of CANNEL and 2600 Tons of well-screened GAS COAL, to be free from Shale and Pyrites, and to be delivered at the Town Stations (Midland or Great Northern Railways), Sutton-in-Ashfield, in such quantities as the Manager shall from time to time direct between July 12, 1900, and June 30, 1901.

LIME.

Also for the supply of about 200 Tons of LIME, to be delivered, at either of the above Railway Stations, in such quantities as the Manager shall from time to time direct between July 12, 1900, and June 30, 1901.

The Lime is to be hand picked, and clear from Refuse and Ashes.

TAR AND LIQUOR.

Tenders are invited for the surplus TAR and AMMONIACAL LIQUOR produced at their Works from July 12, 1900, to June 30, 1901, to be delivered in Purchaser's Tank-Waggons at the Great Northern Railway Station, Sutton-in-Ashfield.

Tenders for Coal to state price per ton of 20 cwt. at the Works or above Railway Stations.

No Tender Forms provided.

The Committee do not bind themselves to accept the lowest or any Tender.

Tenders, endorsed, to be addressed as under so as to arrive not later than the 10th day of July, 1900.

By order,
JOHN D. FIDLER,
Clerk.

Council Offices, Sutton-in-Ashfield,
June 29, 1900.

CROWBOROUGH DISTRICT WATER COMPANY.

SALE BY TENDER OF 500 NEW ORDINARY SHARES OF £10 EACH.

MINIMUM PRICE £10 PER SHARE—PAR.

NOTICE is Hereby Given, that it is the intention of the Directors of the Crowborough District Water Company to SELL BY TENDER FIVE HUNDRED NEW ORDINARY SHARES of £10 each in accordance with the provisions of the Crowborough District Water Act, 1899. These Shares may rank for Dividend up to 7 per cent. per annum.

Particulars, with Conditions and Form of Tender, may be obtained on application to the undersigned; or to Messrs. Verrall and Borlase, Solicitors, 4 and 5, New Road, Brighton; or to the Company's Bankers, Messrs. Barclay and Company, Limited, Union Bank, Brighton, or at their Head Office, 54, Lombard Street, E.C.

Tenders must be received not later than Twelve o'clock noon, on Friday, the 27th of July, 1900.

The Shares will be allotted to the highest bidders at or above the minimum price.

By order,
HERBERT SPROTT,
Secretary.

Offices: Crowborough, Sussex,
June 26, 1900.

URBAN DISTRICT COUNCIL OF ELLESMERE.

CONTRACT FOR GAS COAL.

THE above Council are prepared to re- ceive TENDERS for the supply of COAL for their Gas-Works during the Year ending the 24th of June, 1901.

The Coal must be a good Gas Coal, screened and delivered free at Ellesmere Railway or Canal Wharves.

Sealed Tenders, endorsed "Tender for Gas Coal," accompanied by Analysis, to be sent to me not later than Friday, the 6th of July next.

R. E. LLOYD,
Clerk to the Council.

Ellesmere, June 12, 1900.

NEWCASTLE-UPON-TYNE AND GATESHEAD GAS COMPANY.

SALE OF ORDINARY STOCK.

THE Directors have instructed Mr. ROBERT MACK to SELL BY AUCTION, at the Offices of the Company, Newcastle-upon-Tyne, on Wednesday, the 11th day of July, 1900, at Twelve o'clock noon,

TWENTY-FIVE THOUSAND POUNDS
ORDINARY STOCK

of the Company, to be issued under the Powers of the Company's Act of 1896.

For Conditions of Sale and further Particulars, apply to the undersigned.

THOMAS WADDOM,
Secretary.

Offices: 35, Grainger Street West,
Newcastle-upon-Tyne, June 11, 1900.

SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his AUCTIONS of STOCKS and SHARES in London, Suburban, and Provincial Gas and Water Companies are held PERIODICALLY, at the Mart, Tokenhouse Yard, E.C.

He also undertakes the issuing by AUCTION of GAS and WATER STOCKS and SHARES under Parliamentary Powers.

Terms for issuing such Capital, and also for including Gas and Water Stocks and Shares in these periodical Sales, can be obtained on application at Mr. ALFRED RICHARDS' OFFICES, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
SOUTH ESSEX WATER-WORKS COMPANY.

NEW ISSUE OF £5000 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.

MR. ALFRED RICHARDS will Sell THE ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, July 10, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
EAST GRINSTEAD GAS AND WATER COMPANY.

NEW ISSUE OF 500 £10 CAPITAL "C" SHARES.

MR. ALFRED RICHARDS will Sell THE ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, July 10, at Two o'clock precisely, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of Executors and Others.
STOCKS AND SHARES
IN THE
BARNET DISTRICT GAS AND WATER COMPANY,
HARROW AND STANMORE GAS COMPANY,
WOKING WATER AND GAS COMPANY,
HEMEL HEMPSTED DISTRICT GAS COMPANY.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, July 10, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

Now Ready. Price 6s.

LAW
OF
LONDON GAS COMPANIES

A SYNOPSIS of Public Acts affecting Gas Companies and of the Special Acts of the Metropolitan Companies, with Comments and a Short History: Including a Statement of the effects of the Conversion Acts of the GASLIGHT AND COKE COMPANY, and of the SOUTH METROPOLITAN COMPANY, and an Examination of the Capital and Loan Accounts to date of the three London Companies and of the Bills now before Parliament.

BY

T. J. BARNES,

OF THE MIDDLE TEMPLE *Barrister-at-Law.*

WALTER KING,

OFFICE OF THE "JOURNAL OF GAS LIGHTING," &c.,
11, BOLT COURT, FLEET STREET, E.C.

SOUTH METROPOLITAN GAS COMPANY.

SALE BY TENDER OF £30,000 THREE PER CENT. PERPETUAL DEBENTURE STOCK.

MINIMUM PRICE, £97 PER CENT.

NOTICE is Hereby Given, that it is the intention of the Directors of this Company to SELL BY TENDER £30,000 of THREE PER CENT. PERPETUAL DEBENTURE STOCK, in accordance with the Provisions of the South Metropolitan Gas Acts, 1882 and 1896.

Particulars of same, with Form of Tender, can be obtained at this Office on application to the undersigned; and Tenders must be sent in on or before Tuesday, the 10th day of July next.

The Stock will be allotted to the highest bidders; but no Tender will be accepted at a lower price than at the rate of £97 money for each £100 Debenture Stock.

By order,
FRANK BUSH,
Secretary.

Offices: 709A, Old Kent Road,
London, S.E., June 9, 1900.

By order of the Executors of the late W. J. Bryan, Esq.

SALE OF GAS STOCKS.

MR. GODFREY C. LAMBERT has re- ceived instructions to SELL BY AUCTION at the Greyhound Hotel, Croydon, on Thursday, July 12, 1900, at Six o'clock precisely, in Lots—

£1722 5 per cent. ORDINARY STOCK and £198 PERPETUAL 5 per cent. DEBENTURE STOCK of the CRYSTAL PALACE DISTRICT GAS COMPANY; also

£500 "A" ORDINARY STOCK of the MITCHAM and WIMBLEDON DISTRICT GASLIGHT COMPANY, paying 10 per cent.

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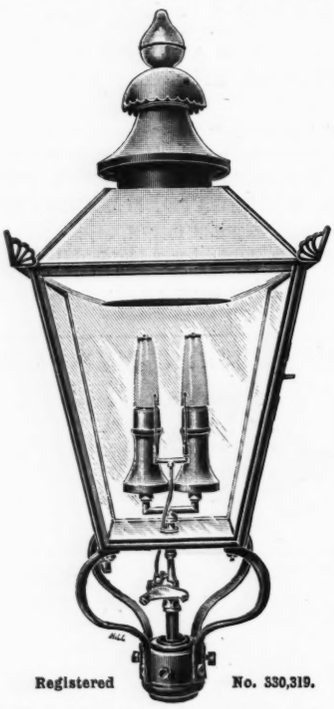

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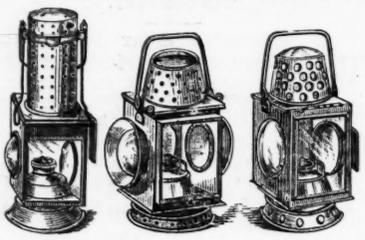

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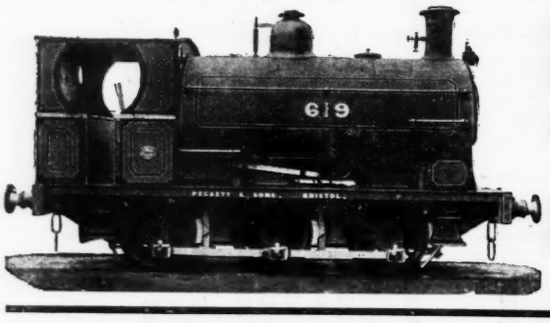

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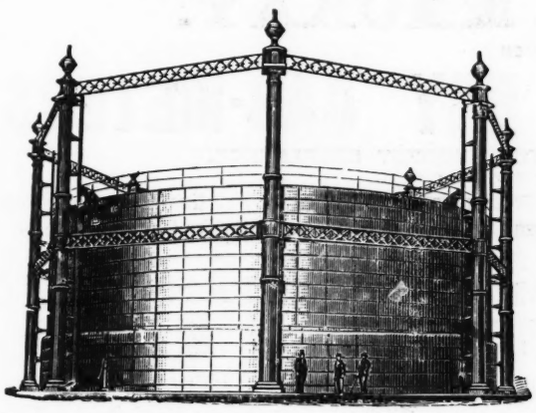

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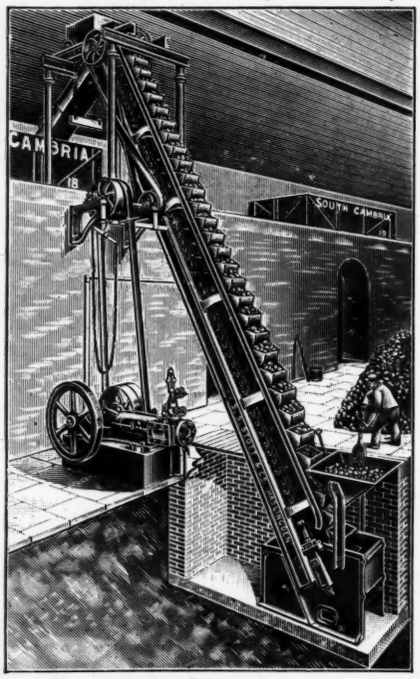

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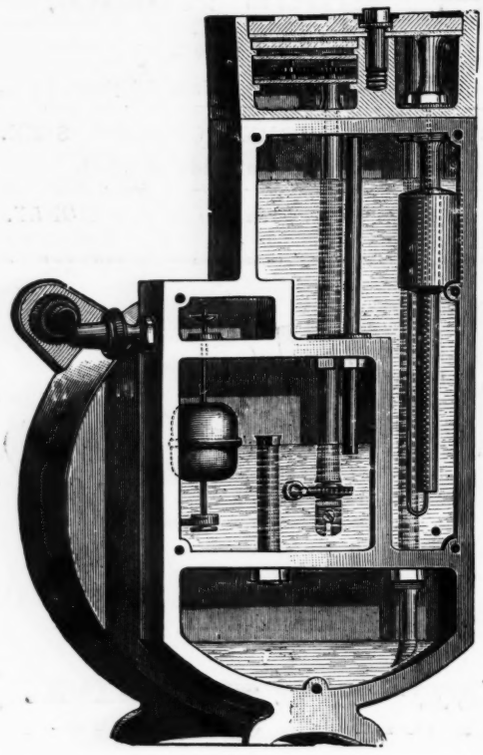

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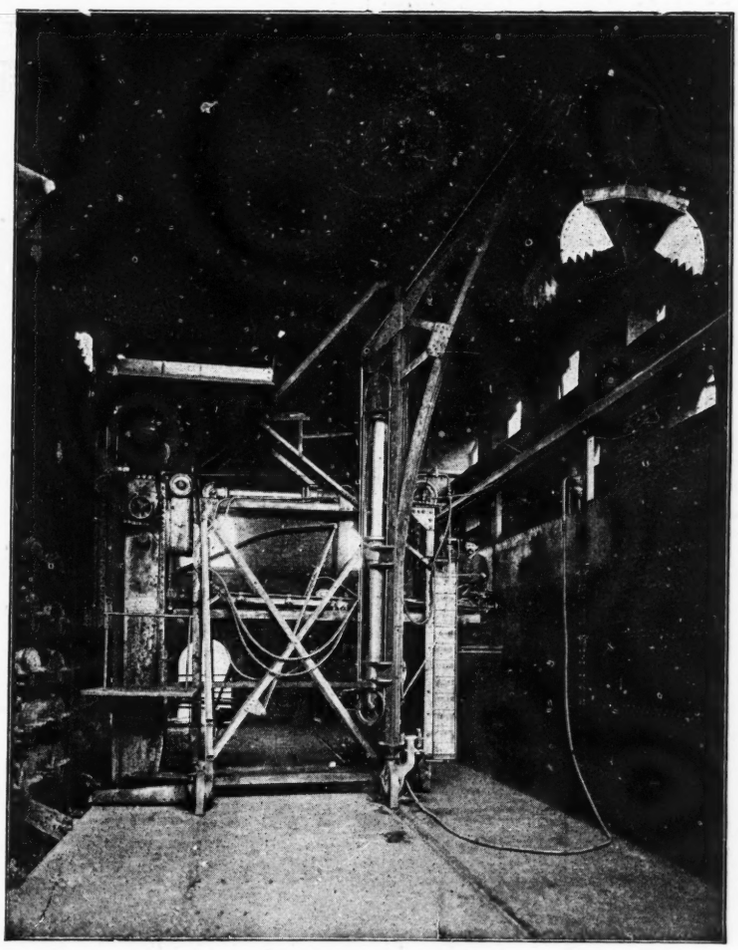

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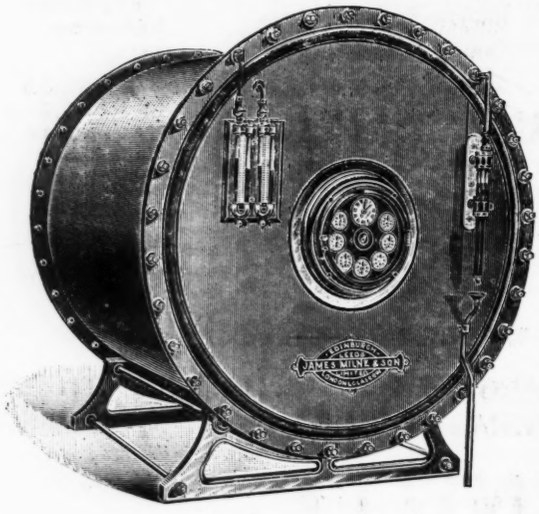

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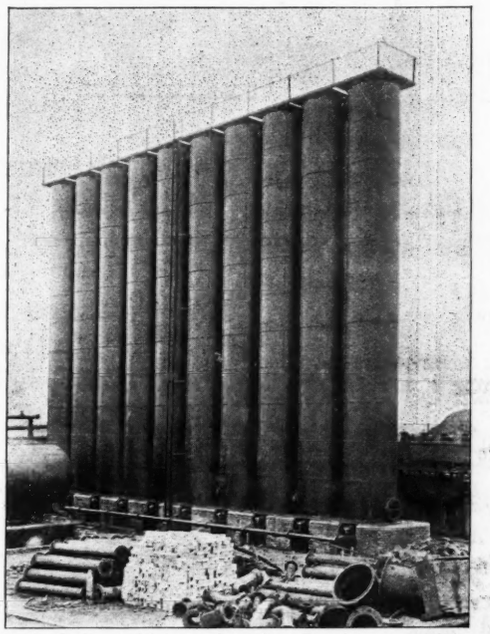

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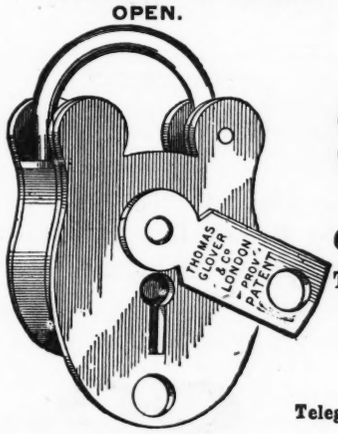

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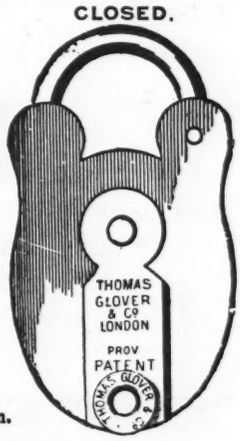

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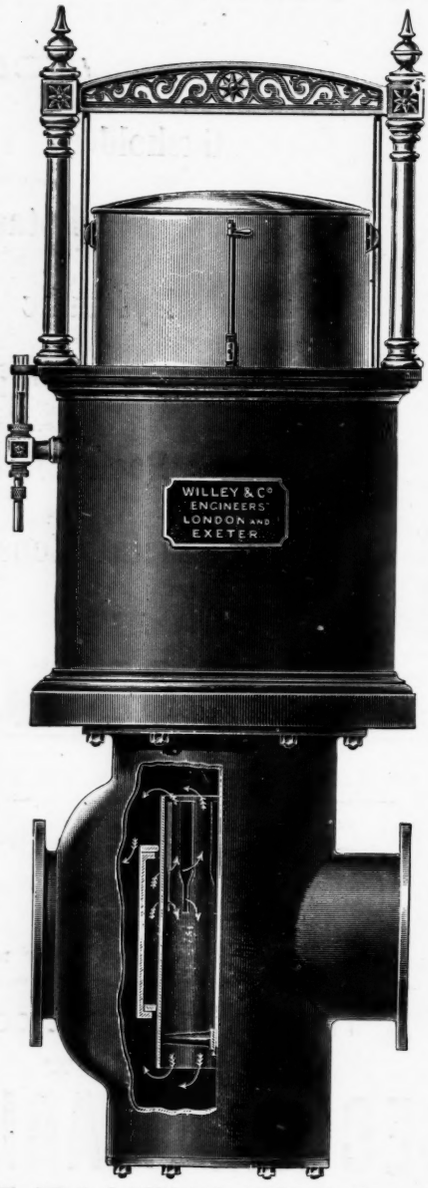

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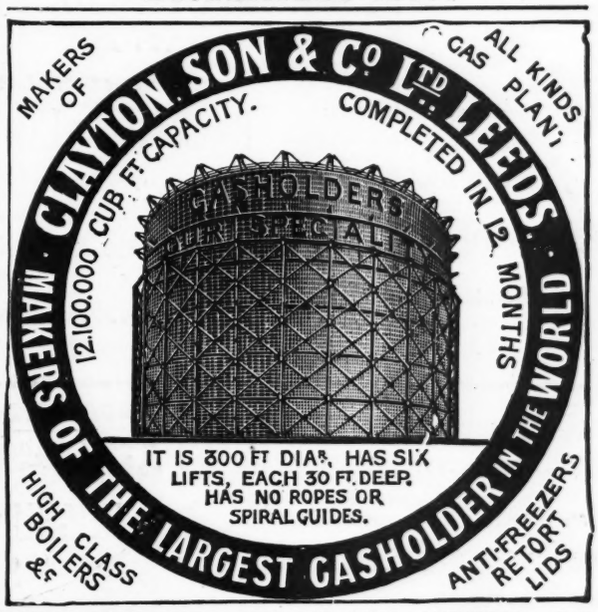
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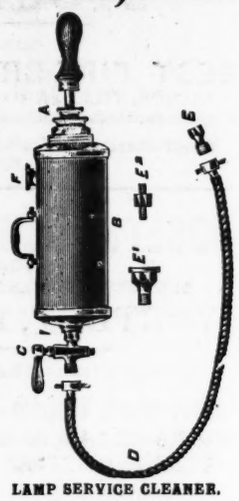

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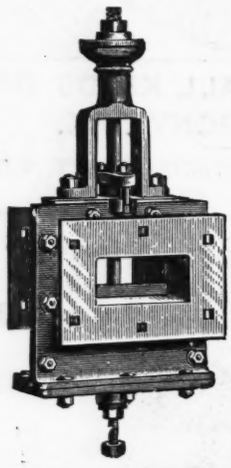

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